THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIV. No. 593.] LONDON, SEPTEMBER 22, 1874. [26TH YEAR.] Price 6d.

RAMSAY'S NEWCASTLE CANNEL COAL. Analysis—10,000 cubic feet of gas per ton of coal; 26-candle gas; 13¼ cwt. coke per ton of coal.
The London Exhibition in 1851 was lighted with gas made from Ramsay's Cannel.
RAMSAY'S PATENT CONDENSED COKE.
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828. FIRE-BRICK WORKS, established 1804. FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire-Clay. The Fire-Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article. The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the Works are the most extensive in the Kingdom.
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GENUINE TORBAY PAINT
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SPECIAL GASOMETER PAINT
(Mixed ready for use).
FOUR PRIZE MEDALS.
WORKS: BRIXHAM, TORBAY.
These Paints are now used in 100 Country Gas-Works, and by all (but one) of the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. They will cover tar effectually. Also used by the Admiralty, War Office, Railway Companies, Founders, &c.
They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
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SPECIALITIES IN WOOD
FOR
PURIFIERS & SCRUBBERS
MADE FROM THE BEST QUALITY
OF
WELL-SEASONED PLANKS.
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COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS-RETORTS and other OBJECTS in FIRE-CLAY," and they were also awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS-RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
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AND
THE ALMA WORKS, WALSALL.
Established at the commencement of Gas Lighting.
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16, SOHO SQUARE,
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J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water; Gun-Metal Cocks, Stocks, and Dies; Galvanized Tubes and High-Pressure Tubes, &c.
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FIRST-CLASS MATERIALS & WORKMANSHIP;
Also, STATION-METERS, PRESSURE-GAUGES, STREET-LAMPS, REGULATORS, &c.
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CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
SUGAR, SALTPETRE, AND ALL KINDS OF PANS.
Roofs, Girders, and Bridges, and General Smith's Work.
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J. & W. ROMANS, Consulting Gas Engineers and Coal Factors, of Edinburgh and London, CONTRACT for supplying any quantity of COAL and CANNEL.
They are also Contractors for leasing Gas-Works, for supplying, erecting, or repairing gas apparatus and fire-clay goods.
Messrs. ROMANS, being lessees of several Gas-Works, have their Cannels tested in the ordinary working process, thus securing for their customers a guarantee beyond mere laboratory experiments.
Analysis, prices, and other information will be forwarded on application to their Offices, 8, Forth Street, EDINBURGH; 1, Walbrook, Mansion House, LONDON, or to the "Crown Wharf," Thomas Street, Limehouse, LONDON, where stocks of house, steam, and gas coal are always on hand.
Coal, machinery, fire goods, &c., shipped to all parts of the world.

THE
DUKE OF HAMILTON'S
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CANNEL COAL.
AGENT:
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GEORGE GLOVER & CO.,
PATENTEES OF THE
NATIONAL STANDARD GASOMETERS
For the English Government, and for the Government of the Netherlands;
MAKERS OF THE DUPLICATE COPY
Presented by Her Majesty's Government to the French Government;
AND MANUFACTURERS OF
IMPROVED
DRY GAS-METERS,
Warranted to Measure correctly, and not to vary.
RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;
236, GEORGE STREET, GLASGOW; AND 15, MARKET STREET, MANCHESTER.

G. G. and Co. have just received the only Medal awarded for Gas-Meters at the Vienna International Exhibition.

SILVER MEDAL, PARIS EXHIBITION, 1867.

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ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS

AND

LAP-WELDED IRON AND HOMOGENEOUS METAL BOILER TUBES.

Boiler-Tube Ferrules, Gun-Metal Gland Cocks, Water-Gauges, Whistles, &c.; Stocks, Taps, and Dies for Screwing, and Gas-Fitters Tools.

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MANUFACTURERS of FIRE-BRICKS, LUMPS, & TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

CAFFALL, THOMAS, & CO., LIMITED.

PATENT IMPROVED SEAL

FOR

GAS HYDRAULIC MAINS.

SAVES COAL, RETORTS, FUEL, LABOUR, TIME, SPACE, AND CAPITAL.

PREVENTS STOPPAGE OF ASCENSION-PIPES, DEPOSITION OF CARBON IN RETORTS, THICKENING OF TAR IN HYDRAULIC MAIN.

GIVES MORE GAS PER TON OF COAL, WITH HIGHER ILLUMINATING POWER, SATISFACTION, AND PROFIT TO SHAREHOLDERS AND MANAGERS.

IS STRONG, SIMPLE, EASILY FIXED AND WORKED, AND THOROUGHLY EFFICIENT AT ALL TIMES.

TESTIMONIAL.

Alton Gas and Coke Company, Alton, Hants, April 25, 1874.

GENTLEMEN,—In reply to your inquiry respecting your Patent Dip for Hydraulic Gas-Mains in use at these works, I beg to say that, upon looking into our carbonizing account for the last 12 weeks, and comparing the result with the same quarters of the past five years, I find that your Dip has given our Company an increase of 1286 feet of gas per ton of coals beyond the makes in the other years, notwithstanding the retorts have been in use for three years.

I may say that our Company are so satisfied with the Dips that it is intended to fit up the other retorts with them this summer.

I am, gentlemen, your obedient servant,

Messrs. Caffall, Thomas, and Co., Limited, 28, Gracechurch Street, E.C. WM. TRIMMING, Secretary.

Models may be seen, and information obtained, at the Offices, 28, Gracechurch Street.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;
LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;
HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.;
GAS-FITTERS TOOLS, VALVES, COCKS, &c.

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MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

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HENRY HOWARD & CO.,

COOMBS WOOD PATENT TUBE-WORKS,

OLD HILL, near DUDLEY,

MANUFACTURERS OF

HOWARD'S PATENT IMPROVED WROUGHT-IRON TUBES,

FOR GAS, STEAM, AND WATER;

Also ORDINARY WELDED WROUGHT-IRON TUBES and FITTINGS,

FOR GAS, STEAM, & WATER, EITHER BLACK, GALVANIZED, OR ENAMELLED.

CORE BARS FOR IRONFOUNDERS, STOCKS, TAPS, AND DIES, IRON COCKS, &c.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

(Successors to JOHN WILLIAM O'NEILL & CO.,)

Offices—PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.,

CONTRACTORS FOR GAS PURIFICATION BY OXIDE OF IRON.

The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

JOHN WILLIAM O'NEILL,
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IMPROVED VENTILATING SUN-LIGHTS

WITH TALC REFLECTORS AND SELF-ACTING VALVES TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

GAS ENGINEERS,

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Drawings and Prices upon application.

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GRANGE WORKS, EDINBURGH,

MANUFACTURERS OF

CONSUMERS IMPROVED GAS-METERS;

IMPROVED DRY GAS-METERS, in Cast Iron and Tin Cases,

OF THE HIGHEST EXCELLENCE,

Warranted to measure correctly, and not to vary.

STATION METERS AND GOVERNORS,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c.

Established

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JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

FIRE GOODS, and Salt-Glazed Drain-Pipes.

LONDON WHARF:

Wharf No. 4, inside Great Northern Goods Station, King's Cross, N.;

LIVERPOOL—1, Back Leeds Street,

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.

JOHN WRIGHT AND CO., ESSEX WORKS, BIRMINGHAM,

Beg to call the attention of MANAGERS and DIRECTORS of GAS COMPANIES to the following letter which they have lately received.

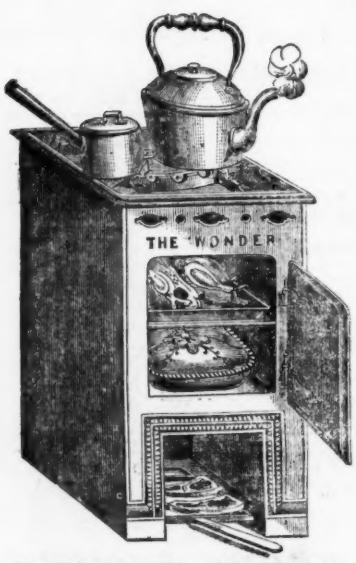
COPY OF LETTER RECEIVED FROM MAGNUS OHREN, Esq.

Crystal Palace District Gas Company, Lower Sydenham, S.E.

To Messrs. John Wright and Co., Essex Works, Birmingham.

Dear Sirs,—In reply to your inquiries, I am glad to state that the use of GAS COOKING AND HEATING STOVES has been a complete success here. We have several hundred in use in our districts. We also find it advantageous to let out Stoves at a small rental. We have now 275 Stoves at rent.

The Stoves you make I can with confidence recommend, having so many in use, and giving satisfaction. I need scarcely point out to you the advantage to Gas Companies to recommend the use of Gas Stoves to their Gas Consumers, even where they do not supply them on sale or rent, as the use of Gas Stoves brings day consumption, and thus the Company make a profit by day as well as by night.—I am, dear sirs, yours faithfully, MAGNUS OHREN.



Size, 25½ in. high; 14 in. wide; 12½ in. back to front.

Price 50s., complete with Pan and Gridiron.

GAS HEATING STOVES

(TERRA COTTA AND IRON).

THE CHEERFUL STOVE.

COOKING STOVES.

BREAKFAST COOKERS.

BATHS HEATED by GAS

GAS STOVES

For Boiling, Broiling, Preserving, Heating Flat Irons, and for all other Domestic Purposes.

Gas Companies and the Trade who have not our Illustrated Catalogue are respectfully requested to apply for same.

A LIBERAL DISCOUNT to the TRADE.

No. 4003.

THE CHEERFUL GAS STOVE, with Copper Reflector,

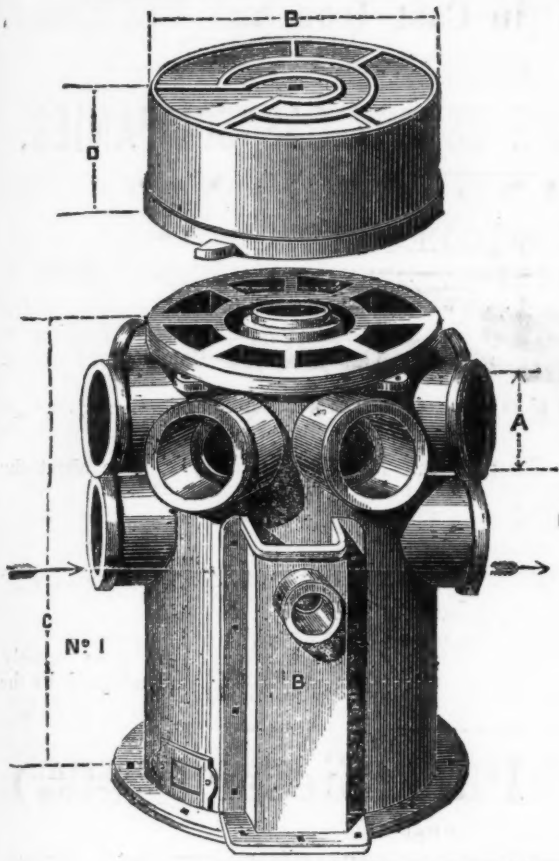
Has all the appearance of a Bright Fire.

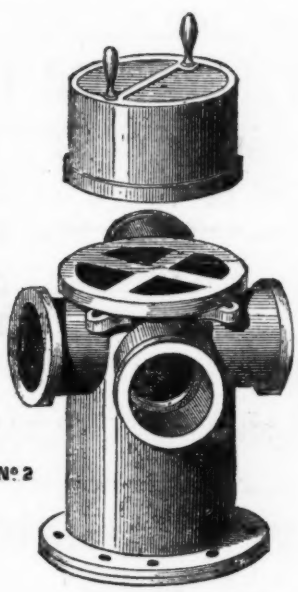
PRICE from 32s.

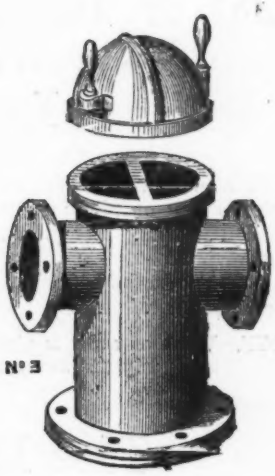
MESSRS. NEWTON, CHAMBERS, & CO.,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD.

IMPROVED CENTRE-VALVES.







THORNCLIFFE IMPROVED BYE-PASS VALVE. SIZES FROM 3 INS. UPWARDS.

THORNCLIFFE IMPROVED STOP-VALVE. SIZES FROM 3 INS. UPWARDS.

Sizes of the THORNCLIFFE IMPROVED CENTRE-VALVE.

	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.
A. Bore of Pipe. . .	4 ..	5 ..	6 ..	7 ..	8 ..	9 ..	10 ..	12
B. Diameter of Body.	16 ..	20 ..	23 ..	26 ..	28 ..	31 ..	34 ..	40
C. Height of Tank .	33 ..	35 ..	38 ..	43 ..	46 ..	48 ..	51 ..	56
D. Depth of Cover .	8 ..	9 ..	10 ..	11 ..	12 ..	13 ..	14 ..	16
Total Height . .	44 ..	44 ..	48 ..	54 ..	58 ..	61 ..	65 ..	72

In all cases the Covers are cast heavy enough to resist any required pressure.

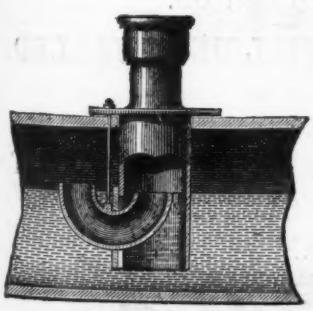
The advantages derived from the adoption of these Valves are so manifest and cardinal that in the immediate character of the change—the simplicity of the machine—the facility affording for cleaning out connexions between Valve and Purifier—the perfect collection and delivery by suitable overflow of the ammonia, at a greatly diminished depth from ground-line over the old form of Valve—the advantage of connecting on the same level, and at any angle, or opposite to each other, the inlet and outlet pipes without dip or rise—the clear acquisition of space in the purifying-house, by being able to place the boxes nearer together, the new Valve being entirely under the floor—and lastly, though of the greatest importance, the passage of crude and unpurified gas during the change is minimized to the merest fraction, thus preventing the fouling by impure gas the delicate machinery and easily affected exposed movements of the station-meter, thereby preventing the introduction of the enemy (unpurified gas) into the gasholder. Also a dead abutment is offered to all back pressure, imparting thereby to the gauges, governors, and hydraulic seals, a steadiness of action never realized with the once famous, but now fast becoming obsolete, Hydraulic Centre-Valve.

N., C., and Co. also Manufacture and Erect

PURIFIERS, CONDENSERS, SCRUBBERS, GASHOLDERS, ROOFS,

And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.



DIP-PIPE, No. 1.

Messrs. N., C., and Co. are also the Sole Agents for

HAWKINS' PATENT SELF-ACTING HYDRAULIC DIP-PIPES.

By their use the whole of the pressure caused by the Seal in the Hydraulic Main is entirely avoided, thus securing the many advantages long sought for.

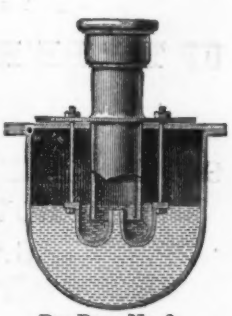
Over 50 Gas Companies have already been supplied with them, many of which have been using them throughout their entire works continuously for over two years.

They can be applied to existing Hydraulic Dips, and at a very small cost.

They seal themselves in the same manner as the ordinary dip-pipes, therefore they are not likely to get out of repair.

By the aid of the adjusting screws they can be made to work on the old principle at pleasure.

FOR PRICES, TESTIMONIALS, &c., APPLY TO



DIP-PIPE, No. 2.

Messrs. NEWTON, CHAMBERS, & CO., Thorncliffe Iron-Works, near Sheffield, Sole Agents;

OR TO THE PATENTEE,

J. G. HAWKINS, NEEPSEND GAS-WORKS, SHEFFIELD.

WILLIAM SUGG,

GAS ENGINEER,

VINCENT WORKS, VINCENT STREET,

WESTMINSTER, S.W.

LIST OF NEW APPARATUS FOR THE USE OF GAS COMPANIES.

Lowe's Jet Photometers

(KIRKHAM AND SUGG'S IMPROVEMENTS),

With New External Water-Line Regulator; Improved Micrometer, with Quadrant divided into 45 degrees; Valve with *pro ratâ* opening; Improved Ventilator, Purple Glass Height of Flame Measurer; King's Gauge Working on Friction Rollers. Complete in French Polished Pine Case. Diagram for ditto, for finding the Illuminating Power in Candles.

Can also be had with Additional Scale on Pressure Gauge, to show by inspection the Illumination Power in Sperm Candles.

NOTE.—When an order is given for a Jet Photometer with this latter addition, it will be necessary to state about the quality of Gas for which it will be used. The range in Candles will not be more than three or four.

The New "Letheby" Photometer,

WITH DARK ROOM, &c., COMPLETE IN ITSELF.

Can be placed in any Office. Will not require a Special Dark Room. This apparatus is arranged upon an entirely New System. Is approved of as a Standard Instrument by the Standards Department, London, and adopted by the Government of Canada.

The Improved "Evans" Photometer (IMPERIAL PATTERN)

DOES NOT REQUIRE A DARK ROOM.

Fitted with all the Newest Appliances, with Sliding Glass Doors for Protecting the Apparatus from Dust. Approved of by the Metropolitan Gas Referees as a Standard Instrument.

The "EVANS" and "LETHEBY" PHOTOMETERS can be arranged for Lamps or Candles.

Standard Burners of all Kinds,

SUITABLE FOR ALL QUALITIES OF GAS.

The "London" Burner

Is adopted by the Gas Referees as the Standard for London, and is made use of in many parts of England, America, and the Continent of Europe, &c.

Sugg's Flat-Flame Burner

Is the Standard Burner adopted by the Gas Referees for Testing Cannel Gas.

UP TO THE PRESENT TIME THESE BURNERS ARE STILL UNEQUALLED.

DR. LETHEBY'S SULPHUR TEST.

GAS REFEREES SULPHUR TEST. GAS REFEREES AMMONIA TEST.

IMPROVED METER FOR GAS, with Self-acting Shut-off Cock.

GAS REFEREES SULPHURETTED HYDROGEN TEST.

PHOTOMETRICAL TABLE. Prepared by WILLIAM SUGG, A.I.C.E.

PHOTOMETERS OF ALL KINDS.

MODERN STREET LIGHTING.—Price, by Post, 1s. 7d.

GAS MANIPULATION.—A New Edition, with Improvements, brought down to the Present Time, is in progress.

TANGYE BROTHERS AND HOLMAN,

LAURENCE POUNTNEY LANE, LONDON, E.C.,

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH

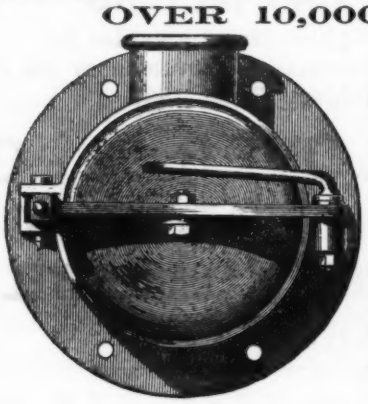
HOLMAN'S PATENT ECCENTRIC FASTENINGS & ANTI-FRICTION CATCHES.

OVER 10,000 IN USE.

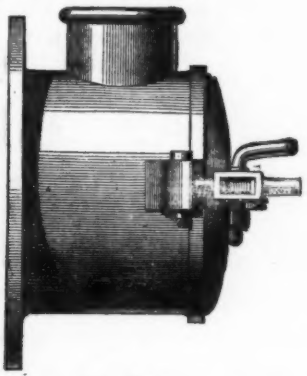
NO LUTING.

LIDS HINGED TO MOUTHPIECES; NO LIFTING ON OR OFF.

NO SCREWS FOR FASTENING.



FRONT VIEW.



SIDE VIEW.

SIMPLE.

ECONOMICAL.

DURABLE.

EFFECTIVE.

NO DUPLICATE LIDS REQUIRED.

These Lids are proved by many eminent Gas Engineers to be the most efficient, saving much time, labour, and expense; are opened and closed as quickly and with as little trouble as an ordinary furnace door, and by their use the Retorts are soundly sealed during the whole period of carbonization.

These Lids are Adopted by the following (among many other) Gas Companies:—

The Gaslight Company, Beckton (where over 2000 are in use).	The West Ham Gas Company.	The Salford Corporation Gas-Works.	The Carmarthen Gas-Works.
" Gaslight Company, Bow Common.	" Imperial Gaslight Company.	" Rochdale Corporation Gas-Works.	" Merthyr Tydfil Gas-Works.
" London Gaslight Company.	" Gas-Works, Arsenal, Woolwich.	" Liverpool United Gas-Works.	" Ystrad Gas-Works.
" Independent Gaslight Company.	" Commercial Gas Company.	" Birkenhead Gas-Works.	" St. Alban's Gas-Works.
" Phœnix Gaslight Company.	" Alliance and Dublin Gas-Works.	" Birmingham Gas-Works.	" Over Darwen Gas-Works.
" South Metropolitan Gaslight Co.	" Edinburgh Gas-Works.	" Nottingham Gas-Works.	" Aylesbury Gas-Works.
	" Manchester Corporatn. Gas-Works.	" Newcastle-on-Tyne Gas-Works.	" Cardiff Gas-Works.

The Morton's Lid is made circular in form, that being the most convenient and suitable shape. It can be used for Retorts of any section, by adapting the Mouthpiece casting from the D, oval, or other shape, at the back, to circular in front.

The following important Testimonial has been given:—

THE GASLIGHT AND COKE COMPANY

(Commonly called the Chartered Gas Company),

BECKTON, NORTH WOOLWICH, July 2, 1874.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—In answer to your inquiry respecting the Self-Sealing Lids, I beg to say that they continue to work well, and I have every reason to be satisfied with them.

I should be very sorry to return to the old system of Luting, and our stokers here freely acknowledge the benefit to them of the new system.

I am, yours truly,

(Signed) G. C. TREWBY.

P.S.—We shall have very shortly about 3000 of your Lids in use.

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Nearly 4000 have been sold since their introduction in 1867.

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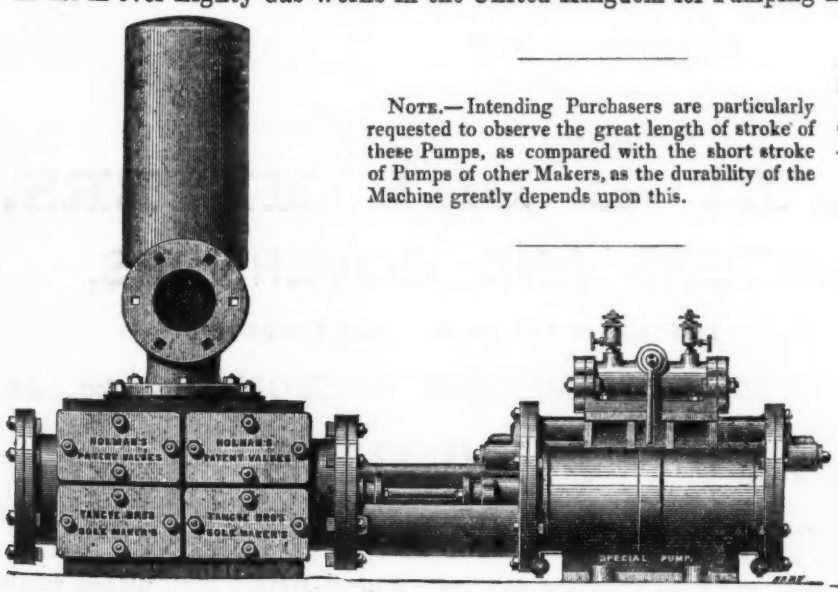

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The following are a few of the leading Sizes:—

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons per Hour, Approximate.	Price.
3	1½	9	550	£16
4	2	9	970	18
3	3	9	2,200	18
4	3	12	2,200	20
6	3	12	2,200	25
4	4	12	3,900	25
6	4	12	3,900	30
6	5	12	6,100	35
7	5	12	6,100	40
8	5	12	6,100	45
6	6	12	8,800	40
8	6	12	8,800	50
7	7	12	11,900	50
10	7	12	11,900	65
8	8	18	15,660	65
10	8	18	15,660	75
10	9	24	19,800	90
12	9	24	19,800	110
10	10	24	24,400	100
14	10	24	24,400	140
12	12	24	35,240	140
21	12	36	35,240	285
14	14	24	47,960	180
26	14	48	47,960	450

London 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 22, 1874.

Circular to Gas Companies.

The report of the directors of the Chartered Gas Company, which we print at length in another column, is much the sort of document we were led to anticipate. It is obviously intended as much for the general public as for the shareholders of the company, and we are glad to notice that it has received a fair share of attention at the hands of the metropolitan press. We are not at all surprised to see that the voluntary submission of the company to a probable loss of £40,000—which might certainly be avoided by another application to the Board of Trade, for which the consumers would have had to pay another £5000—is accepted in the most ungracious manner, for the London papers, with one exception, exhibit a, to us, most unaccountable hostility to the gas companies.

It is not necessary to take our readers over the whole ground traversed in this report. We may fairly presume that the majority of them are acquainted with the privileges conceded to the company by successive Acts of Parliament, after repeated inquiries. They know, also, the obligations imposed upon, and the strict surveillance exercised over the accounts, the manufacture, and the supply of the company. The directors of country undertakings, practically free from control, may perhaps have but a faint idea of the consequences of this supervision; and many local authorities possessed of gas undertakings may thank their stars that the laxity of the law and the indifference of consumers leaves them free from superintendance. Three examinations of illuminating power every day by a hostile authority, and a continuous sulphur test, would bring about considerable alterations in some corporate undertakings. But this is what the Chartered and two other metropolitan companies have now to submit to, with, we say frankly, a benefit to the consumer. Nowhere, not even in Paris, is gas so thoroughly tested as in London with respect to these three companies, and nowhere is the quality of the gas so well maintained.

We recently had occasion to refer to the burner question, with the choice of which the Chartered Company had nothing to do. We notice it here with reference to the correspondence between the Corporation of London and the Referees and Board of Trade, which we published last week, merely to express an opinion that the companies would have no objection to a flat-flame test-burner, for we believe a properly selected one would be a gain of at least one candle to the gas company.

We are pleased to see the reference to the "defalcation "account," since some explanation was required. The Chartered Company are not responsible for this fund. It was "inherited" from the Great Central Company, the directors of which, including two aldermen of the City of London, and more than one common councilman, we rather think, hit upon the happy expedient of making the public repay to them a large sum of money which a shamefully lax supervision of office work, accompanied by singular obtuseness, allowed a clerk to abstract. Such an arrangement, we believe, was never made before, and we sincerely hope never will be made again. A repetition is indeed expressly provided against in the Chartered Company's Act, 1870. But it must be remembered that the arrangement was acquiesced in by the Corporation of London, and that the Chartered Company are only fulfilling a legal obligation in carrying it out.

The passing of the City of London Gas Act, 1868, was hailed with satisfaction, and there is no doubt that its operation was beneficial to the consumer. We might appeal to the records of the Common Council for statements in support of our assertion. But a change came o'er the spirit of the dream. An extraordinary demand for iron arose, creating an extraordinary demand for coal. Large profits were made by some, which the labourers and skilled artizans very properly considered they ought to share, and hence a rise of wages almost universal. This told with especial force against gas companies restricted in profits and limited in price, and fully justified the caution of the framers of the Act of 1868, who, while accepting a low maximum price, inserted, and insisted on, the revision clauses. The directors of the Chartered Company, more hopeful than we, consider the difficulties overcome. They may be for a time, but their recurrence may be anticipated with certainty, and we consider the revision clauses the safeguard of the company, which cannot be relinquished so long as the company exists.

The threatened competition of the Metropolitan Board is disposed of in terms which, while respectful to the Board, are a caution to the gas consumers and ratepayers of London. No greater calamity could befall the Board than that they should carry the Bill they propose to introduce. Trembling in the balance, as they are at the present moment, the downfall of the Board would be certain within a year or two of their obtaining powers to set up competing gas-works. Purchase the companies, as we have told them over and over again they may, at a legitimate price; but if they should set up competing works, only one result could follow.

What the effect of this manifesto, as we may call it, of the company may be, remains to be seen. We do not suppose it will—and, indeed, we do not wish it to—stay the projected proceedings of the Metropolitan Board. For the sake of a little ephemeral popularity, the Board are ready to expend any amount of the ratepayers money, and as it must be spent, it can hardly go to more deserving recipients than lawyers and engineers.

As regards other metropolitan companies, the report can hardly be without its influence, and the price of 3s. 9d., or something near it, we expect will be general next year. We hope it will be so. Each company will, however, consider their own circumstances, and decide according to their particular cases. We anticipate a reduction of price on the part of most, and, if we did not know that the advice was unnecessary, would recommend all the companies whose reports are about to be issued to take the matter into serious consideration before meeting the shareholders.

The principle of amalgamation was first suggested and advocated by the late proprietor and editor of the JOURNAL OF GAS LIGHTING, and we must contend, even now, disappointing as the immediate results of amalgamation appear to many, that they establish the prescience of Mr. Barlow. A careful study of the abstracts of accounts we publish from year to year will convince any one that a real economy has been effected by the amalgamations already made by the Chartered Company, notwithstanding the payment of compensations and superannuation allowances, which have been and always will be inevitable under similar circumstances. That still greater economy would result from further combinations we are satisfied, but we do not expect to see all the gas-works of London united under one direction. What

nature seems to suggest, and what has been suggested in these columns, is a confederacy on each side of the Thames. The southern part of the metropolis will some day have a distinct municipal constitution, and may in all respects be considered apart from the northern side. Half-heartedness and want of enterprise lost the Phœnix Company the opportunity of effecting one amalgamation, which must have brought to them in time the whole of South London. Different counsels prevail on the northern side of the river, and we do not despair of seeing the whole of the companies on this side joined in one, to the advantage of gas proprietors and consumers.

Want of space prevents us from saying more to-day on the questions raised in this report, but we cannot leave it without expressing our almost entire approval of its contents. Bold and uncompromising as befits men standing on their legal rights, the directors are, nevertheless, willing to make some sacrifice in the public interest. A cynical press is disposed to regard this as a concession wrung from weakness. It is a mistake. The Chartered Company might have gone to the Board of Trade with perfect confidence for 4s. next year, and made the consumers pay the cost of the application, and we cannot but admire the public spirit which induces the directors to abstain from such a proceeding.

The report of the Crystal Palace Company has been issued in anticipation of the half-yearly meeting. It states that the profits of the half year are not sufficient to pay the full statutory dividends, which can, however, be made up from previous balances. People curious in such matters, will notice in the accounts that, while coal for the half year cost the company £21,207, coke realized ouly £7196. It is to the serious depreciation in the value of coke that the deficiency of profit is owing.

The Birmingham Gaslight and Coke Company are able to pay a dividend at the rate of 6 per cent. per annum, which is a good result for them, to-day. Coke has been a difficulty even in Birmingham, for trade has been slack in the South Staffordshire district. The undertaking will no doubt pass into the hands of the Corporation of Birmingham next year; but it seems that in the event of a possible failure on the part of the Corporation, the company will again promote a Bill to enable them to raise additional capital and extend the works.

Walsall is a municipal borough, the limits of which, on the day the last census was taken, included 46,447 persons. It is also an improvement district, the commissioners limits including only 40,301 persons. It is, further, a parliamentary borough, with a larger population than the municipal borough. With this last we have nothing to do; we only mention it *en passant* to show the excessive simplicity of all the arrangements of our institutions. At the present moment the gas-works are vested in the Improvement Commissioners, but a proposal is now made to transfer them to the Town Council. The odd thing is, that one condition of the transfer is the addition to the present gas debt of the sewers and other debts of the commissioners, which are henceforth to become a charge on the gas undertaking. The gas debt is now very small—only £11,000—and gas is, and ought to be, cheap in Walsall. If the gas-consuming ratepayers are wise, they will see that the charge is not increased by the addition of the sewers debt, and continue to enjoy the luxury of cheap gas, paying their other debts in a legitimate manner. The matter, however, is to stand over for 12 months, which gives time for full consideration.

Fresh complaints are made against the Exeter Gas Company, but the statement of the complainants shows that there are other and more serious nuisances in the neighbourhood which deserve attention. The smell of gas lime, if disagreeable, is not noxious, but the gas company will do well to avoid, as far as possible, all cause of offence; but if the inhabitants object to sulphur in one form outside, they must have it in another form inside, their houses.

We have to correct a statement made in our last respecting the make of gas at the Glasgow works. Not having the accounts of the Corporation before us, we relied on the figures given by the correspondent of a Glasgow paper, who calculated the make at 7200 feet per ton of coal. These figures do, in fact, represent the consumption per ton, the make being, as stated in the previous week, 8535 feet per ton. The apparent excess of capital, we have before explained, is owing to the large additions made to works, which though at present unproductive, will soon be required.

Some time ago we made the remark that among the many acquirements expected of a gas manager is some knowledge of law. This knowledge is not always easily acquired, and therefore managers, secretaries, and directors may thank Mr. Reeson, of the Chartered Company, for a compilation* which places all they require within easy reach. One appendix is, just now, of particular interest, for it shows in parallel columns the variations in the City of London Gas Act, 1868, which affected only the Chartered Company, and the special Acts subsequently obtained by the Imperial and South Metropolitan Companies. A valuable feature of the work is a copious index, but we cannot help thinking that the reference would have been much easier if the reader had been referred to pages instead of sections of the Act. Perhaps Mr. Reeson will consider the point when preparing a second edition. The work will be of value to all concerned in the management of gas and water undertakings.

* "The General Acts relating to the Supply of Gas and Water, together with Explanatory Notes and Appendices, &c., withIndex." Edited by Joseph Reeson, The Gaslight and Coke Company, Westminster. Waterlow and Sons. 1874.

Water and Sanitary Notes.

The report of the Birmingham Water-Works Company exhibits a state of affairs rather unusual with water companies. The directors are able to pay maximum dividends, which has not been done for 20 years, and a hope is expressed that it will soon be possible to commence the payment of arrears. Such prosperity, we are afraid, will act as a stimulus to the council to acquire the undertaking. It will be useless to urge that Birmingham is now as well supplied with water as any town in the kingdom, and at reasonable charges. The chance of making a good profit will, no doubt, tempt the Town Council, and set the mayor's persuasive tongue in action. No intimation was given to the meeting of the probability of a sale, and it may be that the company will be left for some years in quiet possession of their property. The Lewes Company are able to pay a dividend of 7 per cent. for the year. At Belper grave charges are brought against the water company, which, if well founded, reveal a state of things which is anything but creditable to the management. We say this because, having so often to defend the rights of companies, we feel bound, when occasion arises, to remind them that they have duties. The complaint is that, while the quarterly payment of water-rents in advance is rigidly exacted, the upper part of the town is frequently without water. There is, of course, an easy remedy for this. If the water runs to waste in the lower part of the town, let the company insist that the fittings shall be kept in proper repair, or cut the water off. Competent management would set the matter right in a week. If this be not done, the complainants should take legal advice, and vigorously act upon it.

Gas, everybody knows, will get into water-pipes empty of water, and servant girls in London have, it is reported, been startled at seeing a flame issue from a tap when they have gone to draw water with a candle in their hand. But we cannot help thinking that there must be some exaggeration in a statement made on a label attached to a bottle of water sent for analysis to Dr. Stevenson Macadam from Berwick:—"From pipe in "Strother's yard after pipe had emitted *a strong flame for eight "and a half minutes.*" As the bore of the pipe would not be less than half an inch, the quantity of gas to give a strong flame for eight and a half minutes must have been considerable. The gas supply of Berwick is in the hands of a company; the water undertaking belongs to a Local Board, who give a constant or an intermittent supply, according to their opportunities. Recently, it would seem, they have only given a supply for twelve hours out of the twenty-four. If there be any truth in the statement we have quoted above, the leakage from the gas-pipes must be enormous, and the Board may well call upon the company to stop it. They have an easy remedy, of which they do not seem to be aware, and it is no business of ours to give them legal advice. Another thing troubles the Board, and that is cisterns in connexion with water-closets. They have been advised—who has not?—that these are a fruitful source of disease, and they have resolved on their abolition. What the inhabitants will do without cisterns, and with such an irregular supply of water, we shall not stop to inquire. The Board have resolved to abolish cisterns within a month. Dr. Macadam's analysis, however, incomplete as it appears to be, points to a pollution which could not arise simply from the connexion of a cistern with a water-closet. Four-and-a-quarter grains of organic matter and nitrates per gallon could not come from the admission of sewer air into cisterns but, suggests that the Tweedmouth water is not so pure as the Council suppose, or perhaps wish to believe. A similar complaint against cisterns comes from St. Leonard's (Exeter), and we expect a crusade all over the country against these most useful of conveniences.

Dinner to Mr. James Blackburn.—On the 22nd ult., at the Mitre Hotel, Manchester, a "welcome home" dinner was given by several of the Lancashire gas engineers to Mr. James Blackburn, chief engineer of the Oriental Gas Company, Calcutta. William Longworth, Esq., president of the Manchester District Association of Gas Engineers, occupied the chair, and Harrison Veevers, Esq., gas engineer, Bolton, the vice-chair. Upwards of twenty gentlemen were present, and the dinner was of the most *recherché* description. The usual loyal toasts having been duly honoured, the chairman proposed "Health and prosperity to Mr. James Blackburn." Mr. Blackburn suitably responded. "Prosperity to the British Association of Gas Managers," was proposed by the vice-chairman, and responded to by James Paterson, Esq., president of the association. "Prosperity to the Manchester District Association," was proposed by Mr. Blackburn, and responded to by the chairman. Several other toasts were given and acknowledged, and a very happy evening was spent, and the best wishes for Mr. Blackburn's welfare unanimously prevailed.

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

XXXI.

The Condenser.

The gas, on leaving the hydraulic main, is combined with certain vapours, which, when condensed, produce tar and ammoniacal liquor, the quantity of the former being controlled by the varied circumstances of the temperature of the retorts, quantity of charge, &c. The ammonia is produced by union of its two elements, nitrogen and hydrogen, which exist in the coal. In like manner, and simultaneously, by the presence of another element, oxygen, water is formed; and this combining with the ammonia produces the ammoniacal liquor, which of course exists only in the state of vapour prior to condensation. However, the greater portion of ammonia passes off with the crude gas, and is one of its most important impurities. A portion of the water is in combination with the coal before being submitted to the process of carbonization.

There are also other vapours intermixed with and composing the gas, which demand the greatest care in order to prevent condensation.

The necessity of condensing the objectionable vapours was understood at the earliest experiments of gas lighting, and probably this knowledge was acquired from the inconvenience experienced by obstructed pipes, occasioned by the vapours being condensed therein. In the preface of Winsor's "Traité," the author lays particular claim to having been the first to introduce a vessel for the purpose of condensation and retaining the liquids derived therefrom, and in his patent of 1804 he refers to them as suitable "for making alum and for other chemical purposes."

As already shown, the first practical application of the condenser on an extensive scale was by placing a serpentine pipe within the tank of the gasholder, through which the gas passed, and as its vapours were condensed the liquids derived therefrom were conveyed to a receiver provided for that purpose. This was subsequently improved upon, by enclosing all the pipes within a separate cast-iron tank filled with water.

Various other methods were afterwards tried; in one of these the gas, as it issued from the hydraulic main, was conveyed into a vessel, "and, by a contrivance somewhat similar to the shower-bath, it was washed and condensed before making its exit to the purifiers." The plan adopted about the same period by John Malam, consisted in having a cast-iron case, in which were a series of divisions or trays, each about 3 inches deep. These were placed the one above the other, at distances of about six inches apart from centre to centre, a space being left at each end alternately for the passage of the gas and water. The water was supplied from above, and on overflowing the top tray, passed to the second, and so on to the last. The gas entered at the bottom of the vessel, and proceeding in a zig-zag direction over the whole of the series of trays, is escaped at the top, and in its transit was cooled to the temperature of the water, by contact with which the gas was deprived of a portion of its ammonia.

In 1817 Perks patented a condenser very similar in form to the ordinary air condenser; but the whole of the pipes were enclosed within a tank filled with water. The only merit attached to this invention is that it gave the idea of the construction of the air condenser, which since then has been so universally applied.

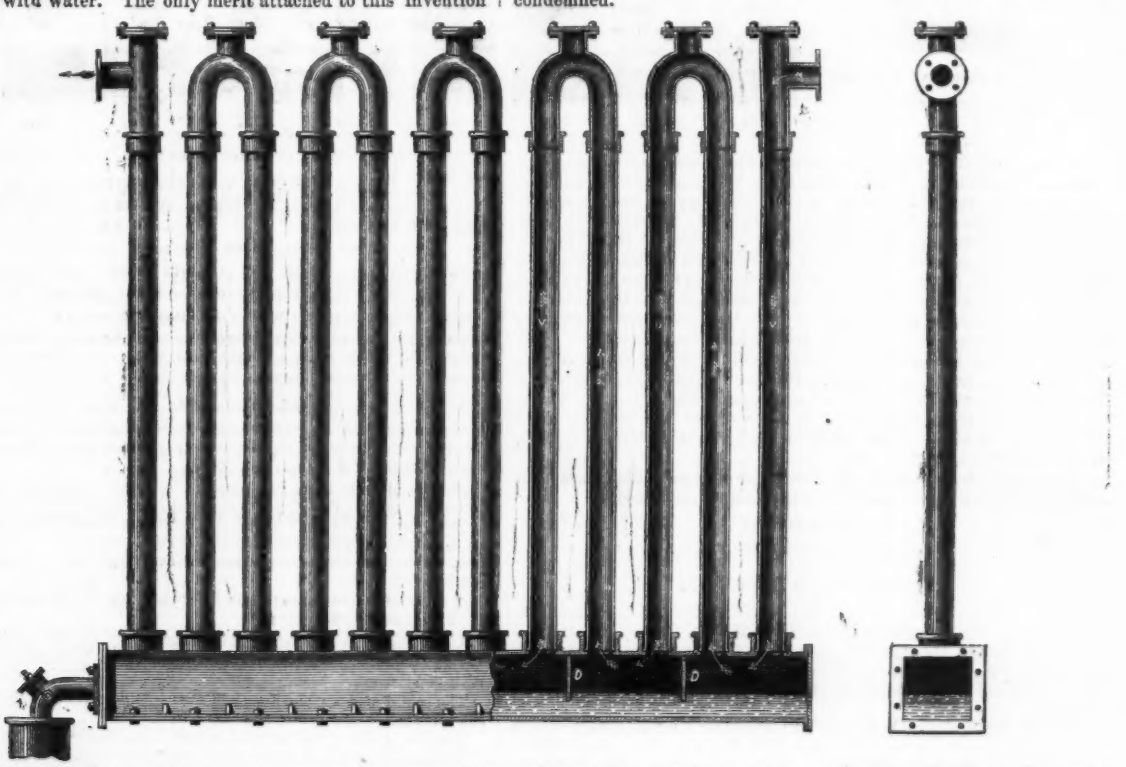
In all the foregoing methods of condensing gas, the object was attained by contact with water, in order, as we may suppose, to conduct the operation as speedily as possible, and in some cases the washing and condensing were effected together; but by such a process a great error was committed.

We are unable to state to whom is due the merit of introducing the "air condenser," whereby the caloric of the gas is conducted by radiation to the surrounding atmosphere, and the intervention of water abandoned. The simple means of radiation were, however, for many years considered inefficient by themselves; therefore, small jets of water were allowed to flow upon the pipes, which was conducive to the more rapid condensation.

Although the condenser is among the most essential apparatus in gas manufacture, there is no other which has received so little attention by way of alteration. The regulator has been patented in all its various forms, times almost without number, but the condenser has been passed with but few attempts at improvement. This may have arisen from the little knowledge possessed of its importance, for until only within the last fifteen years all the old ideas of its functions were retained. Prior to that period, it was considered that the condenser which could reduce the gas to the lowest temperature was the most suitable for the desired object. Thus one of the supposed advantages of Wright's condenser, at the period of its introduction, was that by its use the gas passing therethrough could be reduced to a temperature some few degrees below the external atmosphere.

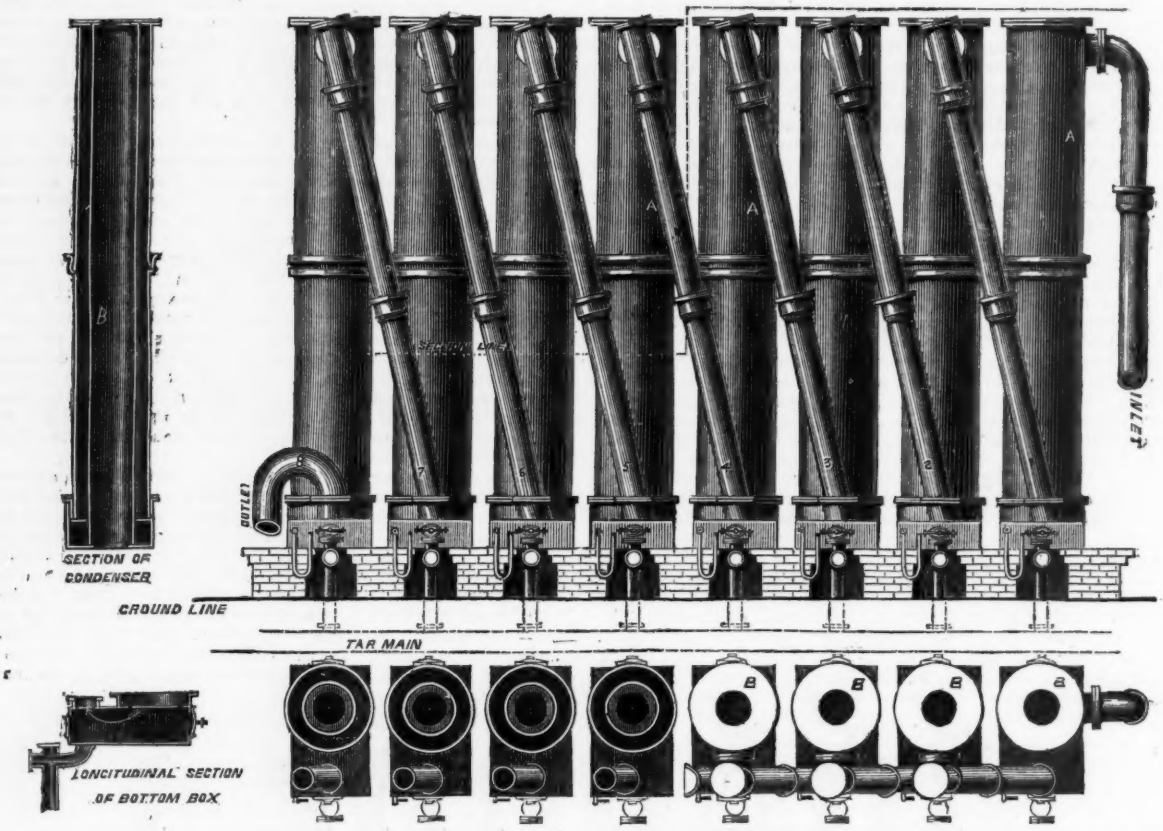
A curious instance of the want of knowledge on the subject in question was displayed by an engineer of eminence, who, in the year 1844, obtained a patent for "improvements in purifyng coal gas, and increasing its illuminating power, and preventing its circulation being impeded by frost." This he proposed to effect by causing the gas to pass through a series of condensing or precipitating vessels, called "freezing cylinders," within which were agitators, to cause the gas to come in contact with the cold surface, and deposit its *moisture*, in the shape of "icy particles, resembling hoar frost." The patentee evidently believed these "icy particles" to arise from the freezing of the aqueous vapours combined with the gas, whereas they were nothing else than the rich hydrocarbons deposited in a solid state, and, of course, by this mode of action, the gas was impoverished in a most remarkable manner. However, by these means, at least one of his objects would be attained, for the gas being deprived of its carbon vapours, there would be no fear of the hydrogen being "impeded by frost."

But this palpable error of the patentee was little more extravagant than some of the contrivances of his predecessors, who invariably attempted to reduce the temperature of the gas to that of the surrounding atmosphere, regardless whether this was in the height of summer or in the depth of winter. Possibly there may be some readers at the present day, who imitate these operations, and thus, by excessive condensation, deprive the gas of its richest qualities. It is also probable that, in some cases, in order to make up for this error, and to bring the illuminating power of their gas to the desired standard, they resort to the use of a considerable per centage of cannel coal. The folly of such operations can hardly be too much condemned.



The simplest kind of air condenser, as employed in very small works, is represented in the annexed engraving. It consists of a square cast-iron chest, made in two pieces, the top and bottom having end-plates bolted to its flanges; on the top part are cast the sockets for

the stand-pipes, and, as shown at the part in section, there are division-plates, *d d*, within, between each pair of stand-pipes, which extend nearly to the bottom of the vessel, leaving a space for the liquids arising from condensation to pass freely. The inlet-pipe is in communication with the hydraulic main, the outlet being connected to the scrubber. The other stand-pipes are connected in pairs by the semicircular bends surmounting them, each bend being provided with a flange for the purpose of clearing out any obstruction that may occur. At the outlet end is bolted a bend (provided with a clearing-out cap), which dips into the hydraulic seal, this being for the purpose of permitting the gas to escape in the event of any accidental stoppage, and so preventing further harm. The chest is charged with water to the height indicated, which, on commencing operations, is speedily displaced by the tar and ammoniacal liquor, and eventually the latter pass off as produced by the bend into the hydraulic seal, and thence to the tar-well. The arrows indicate the passage of the gas, which is forced to traverse all the pipes, and as the heat is radiated, the gas is gradually cooled, or, as generally termed, condensed. In large establishments, two or more rows of condensing-pipes are employed, of diameter and length corresponding with the magnitude of the operations, the accepted rule for their dimensions being to provide an area of 6 superficial feet of pipe for a maximum production of 1000 feet of gas per diem; but modern experience shows, under ordinary circumstances, that a larger surface than this is indispensable, and that 9 superficial feet per 1000 cubic feet are requisite. This, however, is dependent entirely upon locality, for it is evident that the same rule cannot be applicable alike in the frigid as in the torrid zones; as in the former, at times, heat would ha[illegible] to be conveyed to the condensers, in order to prevent the deposit of the hydrocarbons; whilst in the latter, for the purpose of bringing the gas down to the desired temperature before entering the scrubber, suitable means would have to be adopted. For whilst excessive condensation possesses its disadvantages, insufficient condensation has also its evils, for when gas enters the scrubber at a higher heat than is necessary, the temperature of the liquid therein being increased, its absorbent power for ammonia is in consequence reduced, and when tar is increased in temperature, its absorbent powers for the sulphur compounds are impaired. To arrest these impurities in the most economical manner, proper condensation is therefore indispensable.



In the annexed figure is represented the condenser invented by the late Mr. Wright, which differs from those already mentioned, principally in reference to its form. The first condenser of the kind was composed of eight large pipes, each 18 feet high and 3 feet in diameter, and the pipes numbered were 12 inches in diameter. The apparatus is described as follows:—Within each of the outer pipes, *a a*, is placed another pipe, *b*, seen in section and in plan, which is open at the bottom to the atmosphere, so that the air entering thereby, in absorbing the heat, becomes rarefied, and, on ascending, causes a current or draught, which is considered the great advantage with this kind of construction. The gas enters at the top of pipe *a*, and descending, enters the bottom box, of which a longitudinal section is given, and then ascends by the pipe No. 1, when it enters the second pipe, *a*, and so on to the outlet. Each pipe, *a*, has its separate box for the deposit of the condensed liquids, which pass off to the tar-main.

In the next chapter we shall refer to the changes which have been subsequently introduced in the construction of condensers.

(*To be continued.*)

Correspondence.

GAS PURIFICATION.

Sir,—Although Mr. Anderson does not feel hard hits or sarcasm in discussion, yet there are many who do, and who are prevented speaking at the meetings of the gas managers as much from fear of attack as from diffidence.

It is, therefore, desirable to state opinions in such a way that members are not frightened by the *acid* for which Mr. A., upon one occasion, received a well-merited rebuke.

Personally, I like to hear Mr. Anderson speak, as he always states his opinions clearly, and gives younger men the benefit of his large experience. Yet, ever since last meeting, I have been puzzled about his sulphuretted hydrogen, and have asked myself over and over again what becomes of it.

As washing will not remove it entirely, and his lime, when removed from the purifiers, has no smell, will he kindly inform me what removes it from his foul gas?

Telata.

THE DESIRABILITY OF COMPANIES EXTENDING THEIR CONTROL TO THE POINT OF CONSUMPTION.

Sir,—Without themselves undertaking the work, or assuming the responsibility of ensuring the perfect or safe fitting up of dwelling-houses, shops, and other buildings with gas-piping, gas companies are yet in a position to secure, to a great extent, the conditions of satisfactory lighting for their customers, besides providing a safeguard against the necessity of objectionably high pressures in the mains, by adopting and putting in practice a set of bye-laws regulating the size of the meter, and the length and size of piping necessary for a given number of lights, with other matters of consequence.

This is already done in some of the larger towns in England and elsewhere, and as the plan is worthy of more general adoption, I venture to draw the attention of managers thereto, especially as that neither in the paper read by Mr. Crookenden at the recent meeting of the association, or in the discussion that followed, was any reference made to it whatever.

A sheet of instructions to gas-fitters is printed, containing regulations somewhat as follows, viz.:—

The company's servants will in all cases lay on the service-pipe, conveying the same through the outer wall of the premises to be supplied with gas.

The main-cock will be attached to the end of the service-pipe, within the building, and close to the outer wall.

The gas-meter must be fixed within 2 feet 6 inches of the main-cock.

The piping attached to the meter, whether inlet or outlet, must not be smaller in internal diameter than that of the meter unions.

The following are the sizes of meters, and the maximum number of ordinary lights to be supplied by each:—

Size of Meters.	Greatest No. of Burners allowed.	Size of Meters.	Greatest No. of Burners allowed.
2-light	4	80-light	130
3 ,,	8	100 ,,	180
5 ,,	12	150 ,,	250
10 ,,	20	200 ,,	350
20 ,,	40	250 ,,	400
30 ,,	50	300 ,,	500
50 ,,	80	500 ,,	900

The following are the sizes and lengths of iron, lead, or composition tubes to be used, according to the number of lights:—

Internal Diameter of Tubing.	Greatest Length allowed.	Greatest Number of Burners allowed.
⅜ in.	20 feet.	3
½ ,,	30 ,,	6
¾ ,,	40 ,,	12
⅞ ,,	50 ,,	20
1 ,,	70 ,,	35
1¼ ,,	100 ,,	60
1½ ,,	150 ,,	100
2 ,,	200 ,,	200

Tubing of one-quarter of an inch bore is not allowed to be used under any circumstances.

On the completion of the work of fitting, and before the piping is covered up, notice thereof must be given in writing to the gas company's manager (the requisite form for this purpose being obtained at the gas office), who will cause an inspection to be made of the work, and, if found in accordance with the regulations herein contained, it will be passed by the company, and the gas laid on.

If the regulations are not conformed to in every respect, the company reserve the right to refuse a supply of gas until the necessary alterations are made.

Gas-fitters complying with these regulations have their names registered on the company's list of approved fitters, and they are at liberty to designate themselves "authorized gas-fitters."

Other rules will suggest themselves. The description of burners most suitable to be used in consuming the particular quality of gas supplied may also be *recommended*, with sundry useful items of advice as to the employment of bends or round elbows, instead of the old-fashioned abrupt-angled fittings, which, even yet, are often made use of by workmen who are either careless or not alive to their objectionable features.

Gas-Works, Pernambuco, Aug. 22, 1874. THOMAS NEWBIGGING.

Legal Intelligence.

SOUTHWARK POLICE COURT.—SATURDAY, SEPT. 19.

(*Before Mr.* BENSON.)

CONVICTION FOR REFUSING TO SUPPLY GAS.

The Phœnix Gaslight and Coke Company were summoned by Edward Hillier, of 2, Blackfriars Road, refreshment-house keeper, for unlawfully refusing to supply him with gas, whereby a penalty had been incurred of 40s. per day.

Mr. HICKLIN appeared for the complainant, and Mr. ROBERTS for the defendants.

Complainant had been a customer of the company for 17 years, and at first paid them a deposit, which, however, they had returned him with interest several years ago. He regularly paid for his gas up to Christmas, 1873, without dispute, and then he applied to the company for a dry meter, which they granted, and he paid the Christmas quarter's gas, £7 18s. 9d. He afterwards received a bill for the quarter from Christmas to Lady-day, amounting to £12 18s. 9d., which he paid on the 25th of June last, without dispute. He subsequently had an application for £10 19s. 9d. for gas alleged to have been supplied between Lady-day and June, and inasmuch as during all the years he had been a consumer his gas for such a quarter had never exceeded £5, he felt there must be some mistake, and had the meter tested by the Government inspector, who condemned it, when it was taken away by the defendants, and a new one supplied on the 15th of July. He made an application to see the board, and afterwards received a notice that if he did not pay £10 10s. 11d.—the company only agreeing to make an allowance of 9s. for the excessive charge—his gas would be cut off. He afterwards applied to the magistrate, and then the defendants offered to make him an allowance of £4 16s., which he refused, and subsequently they offered an allowance of £6 4s., which he agreed to. He received an account then showing £4 16s. 9d. as due from him. On the 12th of September the collector called and left a notice that the gas would be cut off unless he paid £4 16s. 9d. in three days, which he refused to pay, and on the 17th inst. the gas was cut off.

One of the witnesses for the defence said there had been an escape of gas, owing to the badness of the fittings.

Mr. BENSON could hardly think that, as the company had allowed £6 4s. He considered the company had acted in an improper manner, and such proceedings could not be allowed. The company had deprived complainant of his gas for a clear day, and he therefore inflicted a penalty of 40s., and 23s. costs.

Mr. HICKLIN suggested that the company should immediately put on the gas, and

Mr. BENSON said if it was not done the same penalty would be inflicted for each day.

HIGHGATE POLICE COURT.—MONDAY, SEPT. 14.

(*Before Messrs.* BODKIN, LERMITTE, *and* ELSON.)

BREAKING STREET-LAMPS.

George Jackson, aged 17, a baker, residing at No. 4, Castle Terrace, Child's Hill, was charged with wilfully breaking four panes of glass in a public lamp, the property of the Hampstead Vestry, value 6s.

A lamplighter in the service of the Imperial Gas Company deposed to seeing the prisoner, who was with a companion, throw two stones at the lamp in question, in East Heath Road, Hampstead, between five and six o'clock on Sunday morning. Before throwing at the lamp, prisoner looked round carefully to see if any one was watching. The four sides of the lamp were broken. Prisoner's companion ran away, and witness told the prisoner he should lock him up for breaking the lamp. Prisoner also ran away, and got into some private grounds, where he was followed by a policeman, who took him into custody.

The contractor for keeping the lamps in repair said the damage was 6s., and asked the bench to do what it could to put a stop to this practice.

Prisoner said he threw at a hawk, which was on the direction-board. The stone flew back, and broke the lamp accidentally.

The MAGISTRATES ordered the defendant to pay 6s. for the damage, 10s. costs, and a fine of 10s. 6d., or in default to be imprisoned for 14 days. The money was paid.

WARRINGTON POLICE COURT.—MONDAY, SEPT. 14.

(*Before the* MAYOR, *and other Magistrates.*)

BREAKING STREET-LAMPS.

Timothy Laney was charged with breaking a square of glass in a gas-lamp in Naylor Street, on Sunday morning, and doing damage to the amount of 1s. 6d. At half-past one o'clock on Sunday morning a policeman saw the defendant throw something at the gas-lamp, breaking the glass. Part of an apple was afterwards found in the lamp. Defendant promised to give him 5s. if he would not report the case. Defendant denied the offence.

Mr. PATERSON, manager of the gas-works, said the breaking of gas-lamps had become very serious. Scarcely a day passed without either the glass or the framework of a lamp being smashed and destroyed. It was very difficult to get a conviction in such cases.

Mr. HUNT: I am prepared to say that the gas company have agreed to offer a reward of 5s. to any person who will give such information as will lead to the conviction of an offender.

Mr. WHITE: Defendant is liable to two months imprisonment with hard labour, or a fine of £5 and costs.

The MAYOR: This is an offence that is being repeatedly committed. However, as this is the first case which has come before the court, defendant will be fined £1 and costs. The bench will act very severely in future in similar cases.

Miscellaneous News.

THE GASLIGHT AND COKE COMPANY.

Report of the Directors to be submitted to the Half-Yearly Meeting of Shareholders on the 2nd of October.

In continuation of the announcement made in their last report, the directors have to inform the shareholders that their second application to the Board of Trade, made in January last, in consequence of the extreme price which coal and iron then still commanded, has resulted in an increase in the price of gas being sanctioned, which, as the directors anticipated, has proved, so far as the past half year is concerned, "sufficient to redeem all the pledges given to the company by the City of London Gas Act, 1868." The amount of additional profit thus secured has been supplemented by other advantages, obtained at a late period of the half year, chiefly through a very large alteration in the condition of the coal market which has fortunately led to a readjustment of contracts previously entered into, the effect of which will be so to aid the current half year's profits as to ensure, to the consumers of gas, a substantial benefit in the coming year. Although, by reason of the great depreciation in the value of coke, no advantage has been obtained in the sale of residual products, the directors are happy to state that, in proportion as the resources of the Beckton and the Kensal Green stations become more fully developed, so does the manufacture of gas improve; while at the same time, as they prosecute their unceasing endeavours to effect a reduction in the per centage of unaccounted-for gas, so does the result show the success which is attending those efforts.

The directors have to report the following operations in the way of works:—At the extreme east of the company's districts, the railway to Beckton, which has for some time been completed and opened for goods traffic, has also been opened for passengers. At the westernmost station of the company at Kensal Green, sidings on a large scale in connexion with the Great Western Railway have been constructed, with a view to place that station in communication with Midland, Lancashire, and the Welsh coal-fields, and thus render the company less dependent upon coal, seaborne entirely, from the North of England. Besides this, the station is being generally renovated and rearranged to adapt it to a largely increased manufacture. At Beckton and Bow Common, extensive additions of retort and purifying-houses and gasholders are now actively in course of erection, and, with a view to add to the efficiency of the general supply of gas, and to guard against the consequences of any accidental or partial stoppage in the existing trunk main already laid, the directors are now engaged in laying down a second trunk main, of great size, which will effect complete communication between every one of the company's stations by mains, in addition to the general telegraphic communication, which has long since been established. When these important extensions are finished and in action, there will remain nothing to prevent the sale of the Westminster and Blackfriars works.

For several months much agitation, encouraged chiefly by parish vestries, has existed in a portion of the company's district, as well as in other localities of London—first, against the rate of dividend, which (provided the directors shall display "due care and management") is practically guaranteed to the company by the City of London Gas Act, 1868; and, second, in consequence of the necessity which has arisen for putting in force the clauses of that Act, which, under the late extraordinary circumstances, authorize an increase of price to enable the company to maintain that dividend. To these principal subjects of complaint others of minor importance have latterly been added; and upon the whole of the points now at issue between themselves and the public, the directors desire to draw attention to the prominent features of the Act, which after an inquiry extending over two entire sessions before specially appointed committees of the House of Commons, was ultimately passed by Parliament at the instance of the local authorities themselves.

Successive Acts of the Legislature affecting the supply of gas to the metropolis have imposed upon the producers conditions more and more onerous, those conditions, as regards this company, being at the present time (although the directors make it no subject of complaint) of greater stringency than are applied to any other gas company in London. At the same time, the initial price fixed by Parliament has been as constantly reduced. No attempt has, however, been made by Parliament to withdraw the right, conferred by the Gas-Works Clauses Act, 1847, to pay to shareholders a dividend at the rate of 10 per cent. per annum, and that rate of interest, which was again secured by the City of London Gas Act, 1868, as part of a distinct and solemn Parliamentary compact, has, in the case of this company, on two separate occasions, been recognized by both Houses, and, in spite of the most strenuous and sustained opposition from those powerful bodies, the Corporation of London and the Metropolitan Board of Works, been deliberately affirmed and upheld, in direct and admitted recognition of the great public service which this company has performed in voluntarily abandoning manufacture in the heart of London, and removing its chief works to an unpopulated district. On the faith of this compact the shares in the company, which have been issued since the year 1868, have been subscribed for. The whole of the other provisions of the Act of 1868 are in the interest of the consumer of gas, and were intended to, as in fact they do, secure to him an economical and progressive administration of the affairs of the company, as well as a supervision of their management, for which the directors cheerfully, and even thankfully, afford every facility.

Much has been said of the malfeasance of directors who, as it is alleged, conducting their affairs with culpable extravagance, have availed themselves of the powers conferred by their several private Acts of Parliament to issue to their shareholders new shares, and so to add to an unnecessarily large capital because a 10 per cent. dividend was guaranteed upon it. Without pretending to an intimate knowledge of what may be the practice of other companies, it may, in reply to this attack, be briefly stated that, since the year 1868, The Gaslight and Coke Company, as can be seen from their published accounts, have raised by shares and debentures, and expended on works for the public service, no less a sum than £1,677,500, the whole of which has been subscribed for at rates of

interest which average 5½ per cent. per annum only. Vestries and others commenting on this company's proceedings have not found it convenient to allude to this fact.

Charges of other financial irregularities, of general illegality of conduct, and of the manufacture and supply of gas of defective illuminating power and excessive impurity, are freely brought against the directors of all gas companies, published in newspapers without inquiry, and as matters of fact, and supported at public meetings by the arguments of persons who know as little of these subjects, or even of the proper means of consuming the gas which is supplied to them, as they do of the provisions of the public Act which was passed for their protection. The directors believe these allegations to be as groundless in the case of the other metropolitan gas companies as they know them to be in their own. Fortunately such charges are easily disproved. A perusal of the City of London Gas Act will show that this company's accounts are public property, and are examined by an auditor, appointed by Government, to whom large powers are given, and whose duties are continuous throughout the year. It will also be ascertained that the company's manufacture is subjected by the Act to regulations of the severest order. Gentlemen of character, position, and scientific attainments have, in compliance with its provisions, been appointed by the local authorities, whose duty (most independently and rigidly performed) it is to scrutinize, and test daily, the quality of the company's gas as it is supplied to the consumer; and the certificates, furnished by these public officers (servants, as before stated, of the local authorities themselves), afford the best testimony in entire contradiction to the reckless assertions of ill-informed or interested agitators.

A fruitful source of controversy has been found in the burner which shall be used by the public officers in testing the illuminating power of the company's gas. The company have no voice in the matter. The duty of prescribing the test-burner is in absolute language imposed by the Act on the gas referees, who, nominated by and acting as representatives of the Board of Trade, exercise their own discretion, and naturally decline to permit any interference on the part of the company with their functions.

An especial object of dissatisfaction to the Corporation of London is the manner of dealing, in the company's accounts, with the defalcation in the late Great Central Gas Company. This defalcation is a liability not created but inherited by The Gaslight and Coke Company on the occasion of the absorption of the smaller company in the year 1870. After the lapse of four years, it is now contended by the corporation that the amount of it should form a charge, not merely upon the general profits of the undertaking, but against the dividends of the present shareholders in the united company. The tribunals, however, before whom this question has been discussed (which include the Revision Commissioners) have uniformly refused to entertain this view as regards a past transaction in respect of which a management, now extinct, was responsible. The Gaslight and Coke Company's Act, 1870, requires, and without injustice, that, "in case of any loss arising from frauds of the company's servants, which the public auditor shall certify has arisen from want of due diligence on the part of the directors, such loss shall be deducted from shareholders dividend," and the directors recognize it as an important part of their duty to exercise the utmost vigilance to prevent such a disaster. The enactment recited has no retrospective effect; and as regards the present item, it is sufficient here to state that the mode in which it has been charged in the company's accounts is in accordance with clauses inserted, at the instance of the corporation itself, in the scheme for the amalgamation of the Great Central Gas Company with this company—has passed under the review of the corporation and Parliament in committee on the company's private Act of 1871—has been sanctioned by the Government auditor for several half years—and until the last year has remained unchallenged. It is most gratifying to the directors to add that, in the course of another year, the whole amount (in respect of which it may be observed that the Revision Commissioners have made no allowance in price) will be fully paid off, and the entry will then disappear altogether from their balance-sheet.

The illuminating power of the gas which the company is bound to supply is higher than that required from any other metropolitan gas company; on the other hand, the initial price which the company is permitted to charge is, in proportion, the lowest in London. Such terms, which it was obviously foreseen by the framers of the Act might, of themselves, produce results ruinous to the shareholders, were qualified by the insertion, prior to the introduction of the Act, of subsequent clauses enabling the company to demand a revision of the price, should it be unable to earn its dividend at the low price originally accorded, and it was enacted that, on application for a revision being made, the Board of Trade should with that view appoint commissioners to institute an inquiry into the position of the company. The rules which are laid down by the Act to guide these commissioners in revising the price of gas are of the most specific and binding character, and it is in terms enacted that "they *shall* fix such a price as shall be calculated to yield to the company, with due care and management, a dividend attaining as near as may be, but in no case exceeding, the rate of ten pounds per centum per annum," and to make up in addition an insurance-fund, equal to one per centum per annum upon the paid-up capital of the company. These provisions, and these alone, induced the directors to abandon the right formerly possessed by them, in common with all other gas companies, of forming a reserve-fund applicable to dividend, and to accept an Act of so otherwise rigorous a character as the City of London Gas Act, 1868.

For the first four years after the passing of the Act its operation was highly favourable to the consumer, and, although during this period the dividend paid by the company fell as low as 4¼ per cent. per annum, and averaged only 8¼ per cent. per annum, no demur was made by the directors, who, having undertaken a duty, did not shrink from its performance. Before the end of that period the cost of labour had largely and permanently advanced, and during the last two years the price of iron has been double, that of coal more than double, the usual rates, while the amount realized by the sale of residual products has not corresponded with the increased price of raw material. The exceptional circumstances provided against by the Act have in fact arisen, and the reciprocal and equitable nature of its one enactment in favour of the company has been manifested, with what effect upon the mind of the consumer has recently been perceived. Another change of circumstances is now occurring, and the consumer, in pursuance of the Act, again takes his place as the person benefited, which position it is to the direct interest of the company that he should continue to occupy. Parliament, in the year 1868, made on behalf of the public a hard bargain with the company. It, however, while insisting upon the best possible terms for the consumer, was just, and careful to provide that its stringent legislation was not altogether such as should preclude the company, at an exceptional period, from all hope of dividend. Recent difficulties being overcome, none rejoice more sincerely than the directors themselves at the reduction in their price which is now so imminent; but the public and the local authorities must understand most distinctly that the company will not tamely relinquish the basis afforded by the Act, but that, in the event of future necessity, the Revision Clauses of the Act will, without the slightest hesitation on the part of the directors, be again brought into play.

On the question of the particular price of gas for the year 1875, it is sufficient to state that the estimates for that year, at the initial parliamentary price per 1000 cubic feet, show a probable deficit in the company's profits to the extent of about £40,000, of which upwards of £30,000 will be due to the insurance-fund. The calls upon this fund having been infrequent, the directors prefer to sacrifice the year's contribution to it; and, as the balance of deficiency would not, in their opinion, be of sufficient importance to justify them in demanding and in incurring the cost of another revision of price to meet it, their charge will, in pursuance of the Act, revert, on the 1st of January next, to 3s. 9d. per 1000 feet for 16-candle gas, at and if possible below which point the directors earnestly desire to maintain it.

Moved, however, by the present abnormal price of gas, and by the appeals of the vestries—regardless of the circumstances which have led to the temporary necessity for a high rate—jealous of the success which under adverse conditions has attended the operations of the company—and ignorant of, or unwilling to admit, the ample protection afforded to the consumer by the Act which they themselves in 1868 assisted to pass—the Metropolitan Board of Works have resolved to assail the company's position from another direction, and to apply to Parliament for powers to construct works to enable them to compete, out of public funds, with the private enterprise of the existing gas companies. The directors do not regard this proceeding with absolute indifference; but they do not hesitate to avow their conviction of the futility of the threatened application—of the deterioration of the position of the gas consumers of London, should, by any mischance, such an application be granted, and the Act be carried out—of the heavy addition to the already grievous burden of the metropolitan ratepayer (not necessarily a gas consumer)—and of the complete perplexity in which the Metropolitan Board of Works would at once find itself involved, should it experience the misfortune of obtaining parliamentary sanction to its scheme.

The directors remind the shareholders that the Act of 1868, in addition to the provisions above discussed, actually contains power for the purchase of the company's undertaking by the Corporation of London and the Metropolitan Board of Works; but the time fixed by the Act, within which the power should have been exercised, was allowed by those bodies to expire without any action being taken. Notwithstanding this neglect of opportunity, should a reasonable proposition be at any time hereafter brought forward honestly and in good faith, for the purchase of the company, the directors will give it that consideration which a matter of such importance deserves, and will place it, with their recommendations, before the shareholders for approval or rejection. In the meanwhile, having passed through a season of much difficulty, and, as they believe, at last entered upon a period of satisfactory trading, the directors will content themselves with diligently and faithfully carrying out the Act, and they are willing, not only to submit as heretofore to all its controlling powers, but also to admit the public into partnership, by a reduction in the price of gas, as often and to as great an extent as the same may be found, by the Government auditor, to be practicable. The directors venture to say that they understand the management of their undertaking, which the Metropolitan Board of Works and the vestries do not. They are conscious of having, with the strictest impartiality, performed their duty to the public, as well as to their shareholders, and they are not intimidated by a suggestion of competition, which, apart from the question of justice, is on the face of it insincere and unpractical. The shareholders may rely on the exertions of the directors, and their officers, to defeat this ill-advised measure, if really brought forward; and it would be well for those who direct the councils of the local authorities were they, for the future, to consider that their policy of harassing the gas companies, and endeavouring to depreciate the value of their property, entails, in its defence, protracted and costly litigation, the expenses of which fall ultimately on the consumer, and result in the indefinite postponement of benefits which an uninterrupted and peaceful conduct of their business would enable the companies to afford.

The directors further desire to point out that the principle of amalgamation, also enjoined by the Act of 1868, has been proceeded upon by them so as to bring within the scope of that Act, so protective of the interests of the consumer, the large districts formerly lighted by the Equitable and the Western Gas Companies, over whose supply no sort of public control had previously been exercised. It has also already resulted in an economy of management, which, although as yet but in its infancy, will continue to grow year by year, and will be entirely to the benefit of the consumer. The directors have frequently expressed their opinion that advantages would accrue from further amalgamations, and now, with the experience of the past and present to guide them, they assert that great additional benefit, attainable by no other process, would speedily be conferred on the consumers of gas, in further and very material reduction in price over the entire metropolis, were the principle of amalgamation extended, and carried out so as to embrace in one management the whole of the existing London gas companies.

One other point of discussion alone remains to be explained. Under the Metropolis Gas Act of 1860, power was given to any gas company to change its supply of gas from common to cannel and *vice versâ*, and by this company's own Act, passed in the year 1870, the company obtained a distinct and separate power to abandon altogether the supply of cannel gas to any portion of its district, the possession of this power having become expedient in consequence of the higher class of cannel coal in the kingdom, at all times limited in quantity, being nearly worked out, and its cost, therefore, being largely enhanced. The directors have for many years past manufactured both descriptions of gas, and maintained throughout almost every street in the parish of St. George, Hanover Square, a double set of mains, so that the majority of the inhabitants of that parish have the choice of using cannel or common gas; and, although the cost of a double manufacture and distribution has been very great, the directors have hesitated to exercise their power to withdraw the cannel supply. In the parish of Kensington, however, and in other districts immediately adjacent thereto, formerly supplied by the Western Gas Company with cannel gas alone, the strong desire of the inhabitants to be supplied with common gas in lieu of cannel gas having been repeatedly notified, the directors yielded to the local pressure, and, at the urgent request of the vestry of that parish, they have discontinued the supply of cannel gas, and substituted for it that of 16-candle gas. The alteration has rendered necessary the laying, at a heavy cost, of a new 36-inch main to Kensington, to connect it with the great trunk mains from Beckton; and the shareholders may perhaps be surprised to learn that the complaints against the directors for having thus complied with the expressed wish of the consumers in that portion of their district, are now as vehement as the outcry six months ago for its adoption was incessant.

The directors have taken this opportunity to go thus fully into the foregoing questions because statements, greatly to their detriment, though utterly at variance with truth, having been so long and so persistently circulated, they feel that further silence on their part might be misconstrued into an inability to give any reply to them.

They cannot conclude their remarks without congratulating the shareholders on the prospect which is before them. Their principal works are the finest which the world has yet seen, and they need only that completion, now so nearly approaching, to produce an economy in manufacture which even at the present moment is hardly surpassed, but which they believe eventually will not be attained by any other company. They lay claim to credit for the condition of prosperity to which a liberal and spirited, but at the same time careful and judicious management has brought the company, and they look with confidence to the maintenance and even improvement of their already advantageous position.

The accounts for the half year, which accompany this report, are in the form required by Government, and speak for themselves sufficiently to render comment on them unnecessary. The directors have sincere pleasure in announcing that the result is to enable them, after providing for payment of interest on debenture and preference capital, to pay a dividend on the ordinary shares at the rate of 10 per cent. per annum, and to carry forward to the credit of the next half year the sum of £34,318 14s. 2d.

The warrants for the dividends on all classes of shares will, according to usual custom, be transmitted to the proprietors, by post, fourteen days after the meeting.

(Signed) S. Adams Beck, Governor.

Horseferry Road, Westminster, Sept. 11, 1874.

BIRMINGHAM GASLIGHT AND COKE COMPANY.

The Half-Yearly Meeting of Shareholders was held on Thursday last—Mr. J. T. Collins in the chair.

The following report and statements of account were presented:—

Your directors have now the pleasure—notwithstanding some adverse circumstances—to recommend an increased dividend. The available balance amounts to £9552 13s. 5d., and it is the opinion of your directors that £9000, part of this sum, may be prudently appropriated in payment of a dividend, after the rate of 6 per cent. per annum, on all classes of shares, leaving £552 13s. 5d. to be carried forward.

The works and mains are in an efficient state, and it is gratifying to know that the improvements recently effected in them at so much cost are yielding favourable results in several directions.

There is no item in the accounts calling for particular notice, except the returns from coke, which are somewhat less than may have been anticipated, owing to the falling off in the demand and reduction in price caused by the decline of trade in the South Staffordshire district.

On the 17th of March last, at the special general meeting of shareholders held for the purpose, the bill for further powers, introduced in the past session of Parliament, was submitted and approved, and on the 24th of the same month, at an extraordinary general meeting, convened to consider the terms of the proposed sale of this undertaking to the Corporation of Birmingham, the terms submitted were unanimously approved. It was then thought possible that, by means of additional clauses to be inserted in our bill, the arrangement might be carried through during the then session, but the Committee on Standing Orders decided that it was not a case in which those orders could be dispensed with; the consequence was that, in accordance with the terms of arrangement, our bill was withdrawn. The Town Council will themselves, in the session of 1874-5, promote a bill to legalize the purchase of both companies, and, at the same time, to provide against the contingency of their bill failing, our application to Parliament will be renewed.

Your directors cannot conclude this report without expressing their deep sense of the loss they have sustained by the lamented death of their valued friend and colleague, Mr. Edwin Yates.

Profit and Loss Account, June 30, 1874.

Dr.		*Cr.*	
Management—		Sale of gas, after deducting discounts, adjustments, bad debts, and expenses of public lamps	£50,774 18 2
Office salaries and collectors commissions	£1,821 11 11	Coke and breeze, after deducting labour, expenses, discounts, and bad debts	21,506 13 7
Fees to directors and auditors	460 0 0	Tar, ammoniacal liquor, profit on fittings, and sundries (less discounts)	6,940 5 6
Stationery, bookbinding, printing, postage and receipt stamps, and incidental expenses	722 14 9	Rents receivable	394 18 4
Manufacture—		Cash discounts on purchases	199 17 3
Coals, including tonnage and delivery	49,803 8 2		
Purifying materials and wages	549 19 11		
Supervision, labour, retorts, tools, and implements, with ordinary repairs	10,114 13 3		
Distribution—			
Ordinary repairs, and maintenance of mains, with costs, repairs, and renewals of services, wages of meter inspectors, &c.	1,883 14 6		
Meters—			
Restoring and maintaining	749 2 8		
Rents, rates, and taxes—			
Rents payable	349 17 3		
Rates and taxes	1,941 14 4		
Law costs & continuous audit	93 13 10		
Interest on loan capital	1,936 10 3		
Bank charges	448 7 2		
Balance carried to balance-sheet	8,941 4 10		
	£79,816 12 10		£79,816 12 10

The Chairman moved the adoption of the report, and in doing so said he thought it would be gratifying to the meeting to see that they were paying a somewhat extra dividend, which they had fairly earned. The directors hoped that it would be the beginning of a brighter prospect for the company. He might state that they were still exercising the same care and supervision over the general working of the company, and the improved results were evidently attributable to the increased plant and improved means which they had adopted in the general manufacture and purifying of the gas. The report stated that the works and mains were in an efficient state, and he might inform the shareholders that every member of the board had been over the works recently, and had seen how well they were going on. In reference to the accounts generally, there was no item calling for particular attention. The shareholders would notice that the trade debts were considerably less than in the last report. The cost of distribution was also less, being now £1883, against £3226 last year. The amount owing to the company was somewhat more, but that, perhaps, was to be expected from the increased cost at which they were selling gas. Horses and carts were this year included in their stock-in-trade, and they had found great advantage indeed in working with their own horses, as contrasted with the uncertainties attendant upon the old method. With regard to coke and breeze, the sale of coke had rather fallen off, which was owing to the falling off in the demand, and the reduction in price caused by the decline of trade in the South Staffordshire district. Their old contracts for coal had not entirely run out when the reduction in coke commenced, which was so far a disadvantage to them. They were now working upon coal at much lower terms than formerly, and this circumstance gave them some hope that the next half year would be a good one. He might add, with reference to the improvements at the works, that they had, with a smaller quantity of coal, succeeded in getting a much greater quantity of gas.

Captain Bullock seconded the motion.

Mr. G. Turner said there were one or two items in the accounts that he did not feel satisfied with. The first item was cash at the bankers, £10,213, on the 13th of June, and on the other side of the account they had a debit of banker's charges of £448. He could not understand why, when they had got an average of £5000 to £10,000 in the bank, they should have to pay charges. He thought it would be advisable to put their account to public competition; at any rate, any large establishment ought to have a special arrangement with its bankers. The chairman had told them that there had been a considerable reduction in the sale of coke. In the accounts, however, the sales of coke and breeze were jumbled up together, and after deducting labour, &c., were set down at £21,506. He could not tell whether this was a fair item or not, and he did not approve of the items being put together in this manner. Then they came to the item for tar, ammoniacal liquor, and profit on fittings. What on earth had profit on fittings to do with tar, unless the directors wished to put the accounts before them in a way they could not understand, and to call the shareholders together merely as a matter of form? Turning to the other side of the account, he was anxious to know what per centage of cannel coal was used in their manufacture. They had a right to know what per centage of this expensive material was used, because, upon the whole account of 86,000 and a half pounds, they were getting a profit of only £10,000. This was an enormous expenditure, and he could not help thinking that with good management it might be cut down. He should also be glad to know what was the per centage of escaped gas, as he understood a year ago that the amount would probably be diminished.

The Chairman said, with regard to the sale of coke and breeze, and tar and fittings, the directors could go on making the accounts longer, but the way in which the items were set down had generally been thought satisfactory to the shareholders. As to reducing the expenditure, it was a matter which particularly had the attention of every member of the board. Every matter, whether of finance or manufacture, was most closely looked after, and he was sure that to the advantage of the company they were not capable of much, if any, further reduction. As they went on they would avail themselves of all economies for the benefit of the company, but they could not at present lay their hands on anything in which they could expect a great reduction.

Mr. Watson, in reply to Mr. Turner's remarks concerning the banking account, expressed his surprise that any one of that gentleman's business experience should have given utterance to such sentiments. He pointed out that the balance in the bank on the 30th of June was not a permanent one, but was there on that date in order to pay their dividend. If Mr. Turner would refer back to the last half year, he would find that at that time they had no balance at all at their bankers, but were £10,000 or £12,000 in debt to them. He did not see how they could ask the bank to lend them money for nothing, and if any one thought they ought to do so, the proposer had better go to the bank and suggest it. He considered that their bankers had treated them very liberally.

Captain Bullock, in reply to Mr. Turner's question concerning the cannel, said that they were burning at the present time something like 7 or 8 per cent. of it. They were reducing the per centage every month, and they hoped, by improved manufacture, almost to do away with it. With respect to the loss of gas, when the present board took to the management of the company the loss was something like 15 per cent., and it was now 7·8 per cent., which was a very low standard. With regard to the reasons why they were not making a larger profit with their large capital, he might state that they were selling gas in Birmingham at so low a rate that it was impossible for them to do better until they could get the full working at the increased price of gas, coupled with a reduction in the price of coal. Coal was not supplied to them in Birmingham at so low a price as might be imagined. Most of it had to come 50 and 60 miles, and some of it farther. The Staffordshire coal would not make gas, or, at all events, it was not economical for them to work; and the consequence was that they were not able to get coal at so low a rate as many other companies.

The motion for the adoption of the report was then approved.

Mr. Watson then proposed the declaration of a dividend at the rate of 6 per cent. per annum, free of income-tax, on all the shares of the company. He congratulated the shareholders that they were in a better position now than they had been for the last few years. The tide of affairs seemed to have turned, and he believed it might be attributed to the close attention given to their duties by the Works Committee. He would venture to say that there was no other company where closer attention was given, or where a more earnest desire was shown to bring the company into a thorough state of prosperity. Their dividend had been well and honestly earned, and he never had more confidence in the balance-sheet of a company than he had in the one which was now presented. He believed there were brighter prospects before them.

The motion having been seconded, was carried, and the usual votes of thanks having been passed, the meeting terminated.

BRISTOL UNITED GASLIGHT COMPANY.

The Half-Yearly Meeting of Shareholders was held on Thursday, Sept. 17—Mr. W. Naish in the chair.

The Secretary (Mr. H. H. Townsend) read the following report of the directors, and the accounts:—

The accounts of the company are for the first time, in compliance with the recent Act of Parliament, presented in a form somewhat differing from that in which they have been usually shown.

The revenue account for the half year ending the 30th of June last, exhibits increased receipts over the corresponding period of 1873, amounting to £11,600, arising chiefly from the higher price charged for gas and for residual products. The increased expenditure, consequent on the still high price of coal, materials, and increased wages, has been about £6200.

In the half year ending the 30th of June, 1873, the directors had to resort to the reserved-fund for £6600, to enable them to pay the accustomed dividend. In the present instance they will require £2032, an improvement over the corresponding half year of 1873; but in the half year ending the 31st of December, 1873, the amount required was only £1440. These differences amply testify to the continued uncertainty as to the cost of manufacture. The sum required for dividend is £500 more than in June, 1873, in consequence of the capital added in November last.

In the month of April last (in accordance with the intention of the directors mentioned in the last half year's report) the sum of £20,000 new stock was sold by auction, and realized £35,569. This was for the purpose of providing for the extension of the works, and was an unavoidable necessity.

Your engineer reports the whole of your works to be in good condition, and the yet incomplete extensions thereto in a state of satisfactory progress. The gasholder at Barton Hill is completed, and now ready for the first inflation.

The award in the long-pending appeal of the company against the assessment to the poor and other rates of the borough has been delivered by the arbitrator, who has fixed the increased valuation at about two-thirds only of the valuation made by the borough surveyors. The increase in the amount of the rates will be about £1000 per annum, and the expenses of the arbitration have been a charge on the company of nearly £2500.

Four of the directors—viz., Mr. Lucas, Mr. Terrell, Mr. Taylor, and Mr. Weston, also one of the auditors (Mr. Tribe)—retire by rotation at this meeting, and are eligible for re-election.

The directors recommend that a dividend at the rate of £10 per centum per annum on the capital of the company entitled to such dividend be declared, and made payable at the bank of Messrs. Cave, Baillie, and Co., Bristol, on and after Tuesday, the 29th day of September inst., subject to the deduction of income-tax.

On the motion of the Chairman, seconded by Mr. Terrell, the report was adopted.

The Chairman then moved that a dividend at the rate of 10 per cent. per annum for the half year ending on the 30th of June last, be declared on the paid-up capital of the company entitled to such dividend, and made payable on and after the 29th of September inst., subject to the deduction of income-tax. He reminded the shareholders that he was unable to be present at the last half-yearly meeting in consequence of ill health, and said he was glad to see them again, for he very seldom omitted any of their meetings. He was not now in good health, and he hoped they would take that into consideration, and bear with him whilst he made a few remarks upon the position of the company. The report very much set out the state of the concern, but they could not call it a satisfactory one. It was most remarkable, but no human ingenuity could foretell or prevent the increase in the prices of the material they used chiefly in the manufacture of their gas; the advance in the price of coal seemed almost a national calamity. It was not merely in the price of coal, but there were many other charges which had also increased. There had been an increase of £525 in wages in the last half year, £1665 in coal, £511 for purifying, and rates and taxes £710. Notwithstanding that, they had made three and a quarter millions of gas more this half year than usual. They could not meet their expenses by those means, and it was quite obvious that the company could not be called upon to meet the advance in the price of labour, iron, coal, and things of that sort. With regard to the subject of rating, he thought they had been very hardly served. The surveyors had made an entirely different result from the company themselves, and they had thrown upon the company the onus of proving that they (the surveyors) were wrong. The company had been put to very considerable expense to gain their point, and the consequence had been that they, the largest ratepayers in the city, had had to pay more than half the costs. He thought it was not acting liberally to the company which lighted the city to screw them up in the way that had been attempted, and they, of course, had resisted it. With reference to the gasholders, the chairman observed that one part of their works was not in correspondence with another part, and they had much more producing than storing power. They had had a large number of retorts erected, and had produced a larger quantity of gas, so much so that they had not storeage room. They had now increased

it by the erection of a gasholder at Barton Hill, which would hold one million cubic feet, and it would be a source of great profit to them when they came to utilize that gas, which before was to a considerable extent wasted. Producing a section of one of Messrs. Mann and Walker's patent scrubbers, the chairman explained that it was a piece of machinery which was now being completed. By means of it they would be able to purify the gas very much more effectually than it had ever been purified before. The persons who erected the machine offered, if the company would permit them, to put up the apparatus for nothing if they would allow them to take the result. The apparatus answered very well in other places, and they were going to put one up in St. Philip's, and another in Canons Marsh. After the gas had gone through the machine every trace of impurity would be got rid of. The company could now challenge the world, for he believed their works were equal, if not superior, to any works in Liverpool or London. The directors were not neglecting the interests of the proprietors, though they were not able to pay so good a dividend. They were doing like Bristol men, "keeping one eye open," or rather both eyes open, and looking after the interests of the shareholders.

Mr. T. P. Josh seconded the resolution with great pleasure. He believed the money had been honestly earned, and that the proprietors were entitled to the dividend. They had been obliged to take money from their reserve-fund hitherto, and they had been only able to do what they proposed to do by the additional price of gas. The variety in the balances on the half years showed that they could not reckon upon such an income as would leave a balance to pay the proprietors their ordinary dividend. They ran the risk of putting their money into a manufacturing concern which might be in various ways neutralized; they were, in fact, threatened with some new invention that would blow gas into the air altogether.

The resolution was adopted.

The Chairman moved that Messrs. Lucas, Terrell, Taylor, and Weston be re-elected directors of the company. He observed that they were a very useful and valuable set of men, and he should be very glad to see them back again at the board.

Mr. H. Oldland seconded the motion, and it was cordially adopted.

Mr. F. Terrell, in thanking the shareholders for their confidence, said he need not, after what the chairman had said, repeat that the interests of the directors were identical with the interests of the shareholders. They always kept a watchful eye upon the expenditure, so that they might produce at their half-yearly meetings the same dividend that they had at present, without, he hoped, having to resort to the reserve-fund, which they had to do at the present time. It was rather a selfish idea, but they might depend upon it the directors would do the best they could for themselves.

Mr. John Lucas next returned thanks. He thought it was most likely that they would, at the present price of gas, be able to make things square and have a little in hand.

Mr. Joseph D. Weston also acknowledged the compliment. He said he could testify that no step had been left untaken to economize the production of gas; and, although the Bristol Gaslight Company did in many quarters bear the reputation of being a very conservative body, he could assure all the shareholders that the directors were really most anxious to adopt every improvement and economize in every way they could; and they had not only the interests of the shareholders, in the first degree, at heart, but they had also before them the interests of the public; and he was sure he was only saying what every director felt—that they were as desirous of reducing the price of gas to the public as they were of fulfilling their duty to the shareholders and paying 10 per cent. He could not sit down without making one brief observation—that a great mistake had gone through the city that they were a company paying 10 per cent. They had raised a capital of very nearly half a million, and they were only paying 10 per cent. upon the original capital of £80,000, and all who had gone into the company since 1857 would know that if they had invested £1800 or £3600 they were only receiving 10 per cent. upon £1000 or £2000. The capital of the company was therefore only paying about 5 per cent. upon the gross amount. He thought this really could not be too much impressed upon the minds of all. If it went forth that they were a company seeking first to pay 10 per cent. to their shareholders, and the city had no consideration in comparison with that, they were really done an injustice to.

On the motion of the Chairman, seconded by Mr. F. Terrell, Mr. Wilberforce Tribe was re-elected auditor, and that gentleman acknowledged the compliment.

Mr. H. Oldland moved that the best thanks of the meeting be given to Mr. W. Naish for his able conduct in the chair, and also to the directors for their efficient management of the affairs of the company.

The Chairman, in thanking the shareholders, said he had been connected with the company more than 40 years. He was getting very old, and he almost felt sometimes as if he ought to leave it, but he liked to stay by the old company, and he hoped it would still maintain its character of being a successful, a wise, and a moderate company.

The meeting then closed.

BRISTOL PUBLIC LIGHTING.

A Meeting of the Sanitary Authority of this City was held on Thursday last, the chief business of which was to receive and consider a letter from the gas company relative to the supply of gas to the public lamps.

The Clerk (Mr. J. G. Heaven) read the letter as follows:—

To the Committee of the Bristol Sanitary Authority.
Bristol United Gaslight Company, Canons Marsh, Sept. 16, 1874.

Gentlemen,—I have to acknowledge the receipt of the letter of the 10th inst., addressed to this board by Mr. Heaven, on the part of the sanitary authority, and which transmits for the consideration of the directors of this company the substance of the resolutions passed at the meeting of your committee on the same day.

The subject has been deliberated on, and I am instructed to state for the information of the committee of the sanitary authority that, desirous at all times, as this board is, strictly to discharge its obligations to the gas consumers, and to use the powers and privileges given to the company by their Acts of Incorporation with the utmost practical liberality, they are unable to accept the proposals contained in the letter herein referred to.

To take the points *seriatim*—

1. As to pressure. There are practical reasons, arising from the great difference in the levels of the district to be lighted, why the company cannot consent to bind themselves to a uniform minimum pressure of one inch. The 20th clause in the Act of 1873 meets these inequalities to some extent, and as the company undertake to supply at each burner, wherever situated, a given number of feet of gas, if that be done, no further restriction of pressure is needed; and the contract provides for penalties in case of default.

2. As to price. The prices tendered are the lowest that the company will feel justified in accepting. Not only is the cost of coal much greater than formerly, and still likely to remain at a high price, but every expense connected with the manufacture and distribution of gas is largely and, it is feared, permanently increased.

The quantity of gas to be consumed by the specified number of lamps (3733) will be 65,912,000 cubic feet, taking the fair average of 11 hours per night per lamp. The gross amount of charge will be per annum £14,387 12s. Deduct from this £3266 7s. 6d., the present actual cost of lighting, repairs, &c., at 17s 6d. per lamp per annum, and the net amount for gas will be £11,121 4s. 6d., which divided by 65,912,000 will give 3s. 4¼d. per 1000 feet as the charge for gas. The lowest price at present charged to any private consumer is 3s. 10d. per 1000 feet.

3. Conditions in present contract to which the company desire to adhere. These are—Provisions as to the erection of new, and alteration of existing lamps, and limitation as to the extent of alterations, &c. Provisions as to 1213 service-pipes in the ancient city. The same as to 92 pipes, &c., in the district of St. James and St. Paul. Provisions as to the distance from the mains and from each other as to lamps to be erected. Penalties not effective in time of civil commotion or unavoidable default. Arbitration clause.

4. Penalty for deficient quantity of gas, &c. The company are willing to bind themselves, as heretofore, in the penal sum of £10,000, and to the small penalty of 5s. for proved default; but decline to submit to the proposed increase of the penalty to £5, as being both exorbitant and unnecessary. The company have always to the full extent of their power carried out their contracts with strict integrity of purpose, and they intend to continue to do so; and they submit that the existing and all former provisions in these respects will be found ample to secure a faithful performance of their engagements in the future.

Finally. The company decline to enter into a contract for lighting the lamps, on the terms of their tender of the 2nd inst., for a shorter time than three years; but they will undertake at the expiration of two years from the date of contract, if in the meantime the price of gas is reduced to the general consumer, to meet the committee of the sanitary authority for the purpose of negotiating a re-adjustment of the prices for the public lamps.

It is well understood by manufacturers of gas, and capable of proof, that no two companies in existence can be (without an intimate knowledge of the individual and widely differing circumstances of each) equitably compared the one with the other. The directors of this company cannot, therefore, be influenced by the action of other companies in the details of their management; but, with every possible consideration towards the committee of the sanitary authority, they must, and do hereby, express their adhesion to the terms of their tender of the 2nd inst.

(Signed) Henry H. Townsend, Secretary.

The Clerk said that, in accordance with the directions of the committee, he had partly prepared a report on the subject. It was not quite complete as regarded some calculations, the statements of the gas company having somewhat thrown him out of his understanding of the matter. He also added that he had received replies from various large towns showing the amount paid by them for the lighting of the public lamps.

A lengthy discussion took place upon the contents of the letter of the secretary of the gas company, but it was thought advisable by the committee, in the interest of the city, that it should not be reported. From the drift of the discussion, it appeared that there were three principal points of difference between the committee and the company—namely, the number of hours that the lamps should be lighted, the amount of pressure, and the price that should be paid under the new contract, the old one expiring on the 29th inst. It was stated by one of the members of the committee that the increased price asked by the company for lighting by far the largest number of lamps would be equal to about 20 per cent. Complaint was also made of the difficulty in getting the accounts of the company for the past two years, and it was thought that they should be investigated before any opinion could be given as regarded the justice of the increased claim made by the company. The increased cost to the city, it was mentioned, that would arise from the acceptance of the tender at present made by the company would be close upon £2400.

The Clerk suggested that it would be desirable to appoint a small sub-committee to meet the directors of the company to discuss the subject. As yet there had been no attempt to treat with the directors.

Mr. Low said he should like the corporation to have the gas-works in their own hands.

After some further discussion, it was resolved that Alderman Proctor Baker and Messrs. Mills and Naish should be appointed a sub-committee to have an interview with the directors of the gas company, for the purpose of discussing the points in dispute.

It was understood that the meeting would take place as soon as possible, and that a special meeting of the committee should be called to decide upon their report to present to the Town Council.

On Thursday evening, a public meeting of the ratepayers of Bristol was held at the Broadmead Rooms, amongst other things, "to protest against the exorbitant price and inferior quality of the gas supply." There was but a small attendance.

Mr. W. Jennings was voted to the chair, and in opening the proceedings he attributed the small attendance to the short notice they had had of the meeting. After reading the notice convening the meeting, he said their gas bills grew larger every half year, but the quality did not grow with the price. It was not individual complaints, however, they had to study; it was the demand of the gas company for an extra £2000 or £3000 for lighting the streets. Surely, with the price of coal going down, it was hardly the right time to enter into an arrangement to pay £2000 or £3000 extra for an article which was decreasing in value. It was also suggested that an arrangement should be entered into with the gas company for accepting this increased price for three years, but there was another proposal for entering into the agreement for one year only, and he thought the meeting would approve of that, or that they should have the gas at a less price than they were now paying.

Mr. H. J. Brown moved the adoption of a petition to the Town Council, expressing the regret of the meeting that the ratepayers money had been expended upon recent doubtful improvements, and their opinion that the recent demand made by the Bristol Gas Company to increase the price of the gas supply cannot be justified, such price being now higher and the gas inferior in quality to that supplied to many other cities of the kingdom. He thought it would be strange if the Town Council and the ratepayers of the city could not do like other large cities—get up their own gas company, and pocket their hundreds and thousands a year, to be devoted to the improvement of the city.

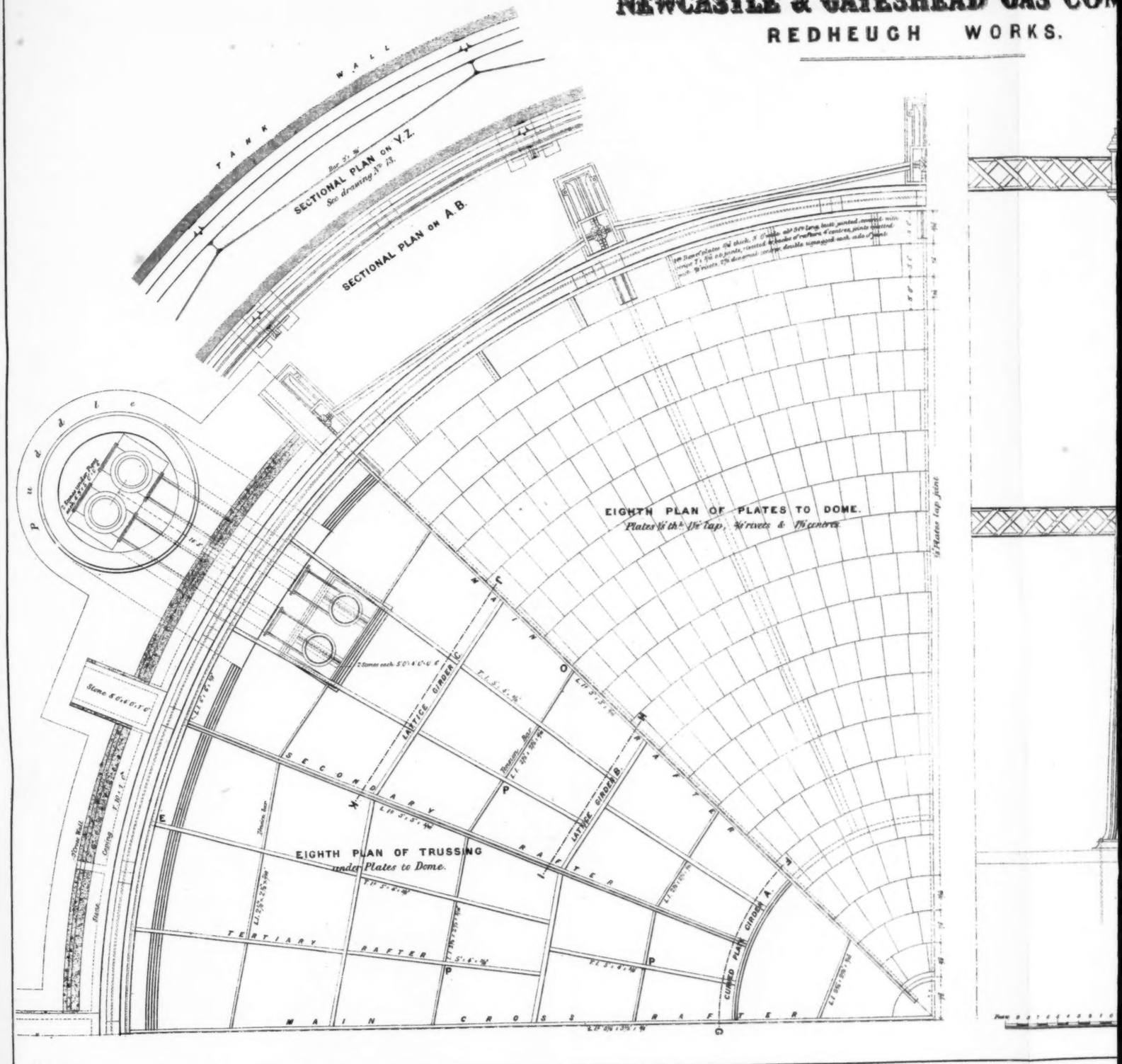
Mr. Abbott seconded the resolution, which was supported by

Mr. J. Foster, who said it was a very serious thing for the city to be asked to put their hands in their pockets and pay £2400 more a year for the lighting of the city; and they ought to know, before they sanctioned it, that the demand was well founded. They might take it for granted that the contract with the gas company, which was just about to expire, was made at the old prices of coal, and that as the price of coal had somewhat increased they might demand some increase; but they ought to know why the increase should amount to 15s. on every lamp in the city. The gas company pleaded that they were losing money by the contract. How, then, was it that they were able to pay a dividend of 10 per cent.? They were not allowed to pay more than a 10 per cent. dividend; but it was notorious to all who knew the company that they had been earning more than 10 per cent., and that they had been obliged to spend it somehow or other rather than reduce the price of gas to its legitimate rate. How was it that in Manchester, where the price of coals was higher than it was here, the gas could be supplied at a lower rate, and that even then they could make a handsome profit, out of which the city improvements were mainly carried out? This pointed to the course which ought to be taken here; they ought not to be in the hands of a private company, that company having a monopoly of the manufacture. If there were two or three gas companies in Bristol, and there was a competition between them, they might stand a chance of getting gas at a reasonable price, but with only one company they had no chance of getting gas at a fair and legitimate price. He thought, therefore, they were quite justified in presenting their request to the corporation. They were in the hands of the company, but the contract could be made for the shortest possible time, and they could see that at the end of that term they were prepared with a better plan. He thought the proper course for the city would be for the city to make its own gas. They made a grievous mistake when they permitted the supply of two such necessary articles as light and water to get into the hands of private companies.

Mr. E. Follwell having referred to the price charged for the public lamps in Exeter, said the Bristol sanitary authority must enter into a new contract on the 29th of September with the gas company, and if the committee did not succeed in getting any alteration, the question would arise as to whether the city should be in darkness, because there was a clause in the company's Act which provided that, in the event of the citizens being dissatisfied with the price of gas, the matter should be referred to arbitration, and if it was then

NEWCASTLE & GATESHEAD GAS CO

REDHEUGH WORKS.



Whiteman & Bass, Photo to Lithe to the Queen, 236 Holborn.

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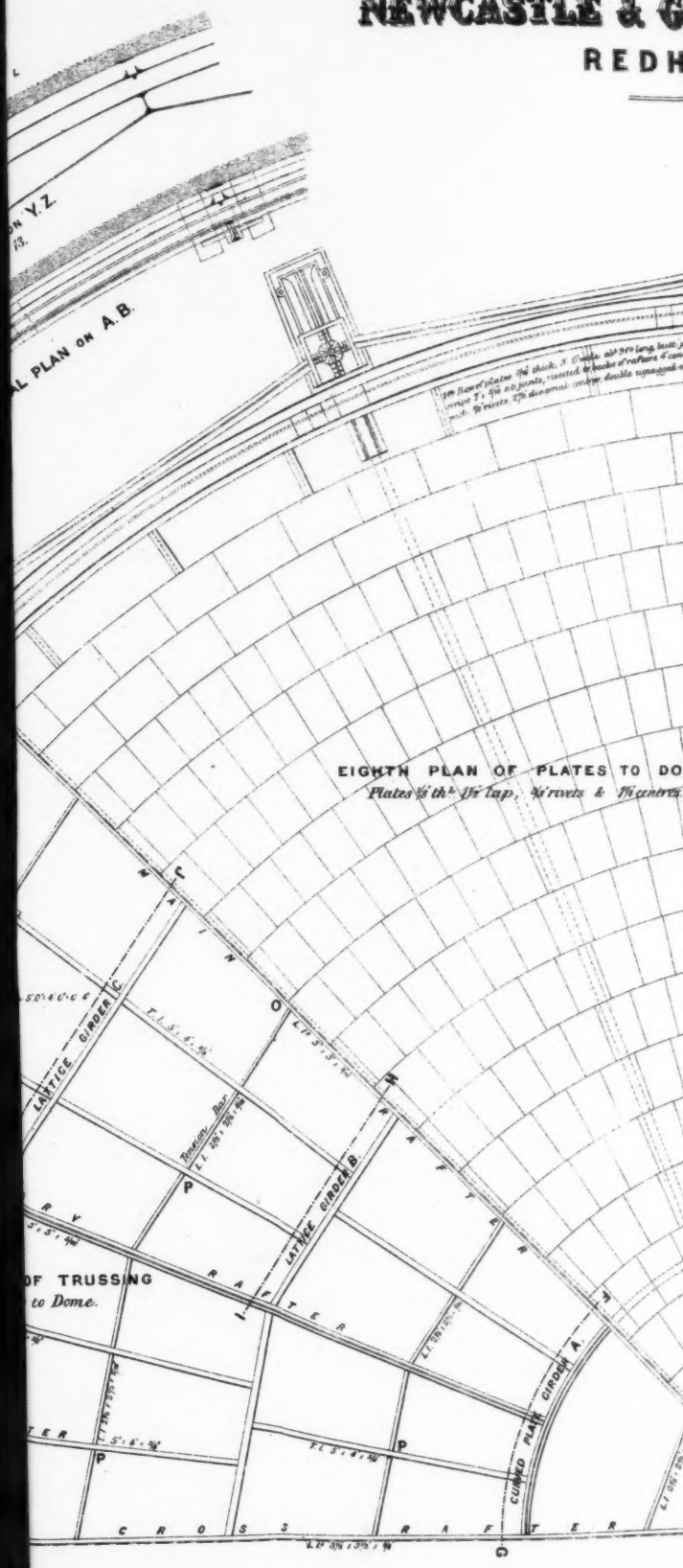
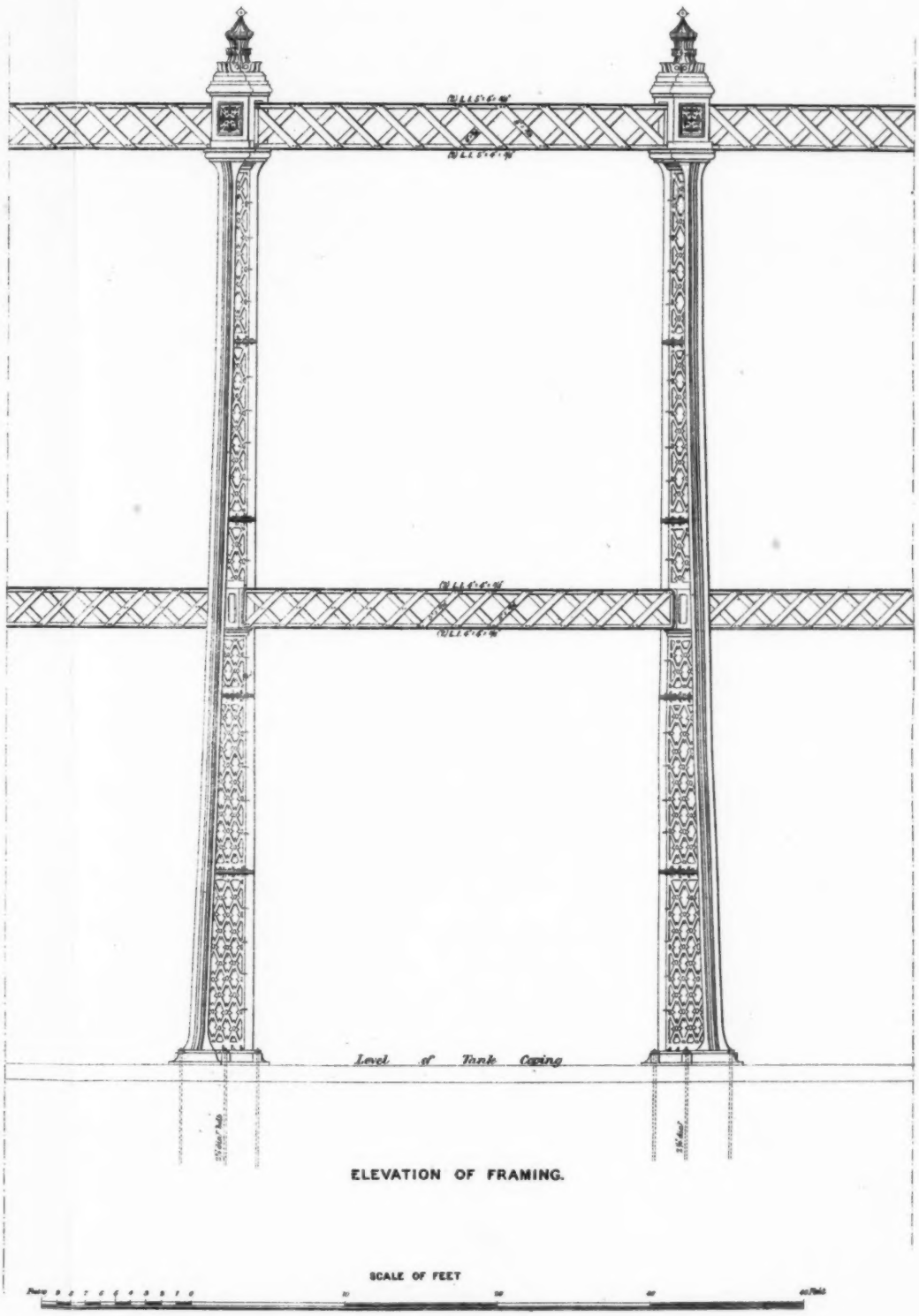


E & GATESHEAD GAS COMPANY.

REDHEUGH WORKS.



ELEVATION OF FRAMING.

SCALE OF FEET

found that they were charging more than they were justified in doing, they would have to reduce the price for the next three years. There would be a special meeting of the Town Council between this and the 29th to know the result of the interview of the committee appointed that day with the directors, and to take such steps as might be deemed necessary.

Mr. LEVY: Can you tell how many aldermen and councillors are shareholders in the gas company?

Mr. FOLLWELL: To my knowledge there are three at the board in Prince Street, but I must do them the justice to say that they vacated their seats this morning when the question of the gas came under consideration.

The motion having been adopted, it was resolved to form a Ratepayers Protection Association, after which the proceedings terminated.

NORWICH GAS SUPPLY.

A Meeting of the Norwich Town Council was held on the 15th inst.—the MAYOR (Mr. S. G. Buxton) in the chair.

Mr. SKIPPER (chairman of the executive committee), stated that a letter had been received from the British Gas Company, relative to the price of gas. As the corporation had made their contract with the company just before the price was proposed to be raised, there would be no difference in the cost of lighting the public lamps.

The CLERK (Mr. Miller) said the letter in question accompanied the accounts which the British Gaslight Company were obliged to forward every half year, showing the position of their affairs and their profits or losses:—

The British Gaslight Company, Limited,
Office, 11, *George Yard, Lombard Street,*
London, Aug. 26, 1874.

Sir,—I beg to forward you the accounts of the Norwich station for the six months to the 30th of June last, from which you will see that, instead of making a profit during that period, the company have sustained an actual loss of £1422 8s. 3d. The operations of the parliamentary financial year ending the 30th of June last have resulted in a deficiency of £7709 1s. 9d. below the amount allowed by the Act of Parliament. This loss has arisen from the high price of coal, labour, and all materials connected with the manufacture of gas. There has also been a considerable falling off in the price realized for residual products. The price of coal is now somewhat reduced, but not sufficiently so as to allow the directors to continue the supply of gas at the present rates. They, therefore, will most reluctantly be obliged to raise the price of gas to 4s. 3d. per 1000 cubic feet from the 29th of September next, of which due notice will be given to the consumers. (Signed) FREDERICK L. LINGING, Secretary.

H. B. Miller, Esq.

Mr. JARROLD observed that it had been announced in London that the price of gas was to be reduced, while in Norwich it was to be raised.

Mr. UNDERWOOD remarked that with the rise proposed Norwich would be 3d. below the maximum.

Mr. FIELD called the attention of the council to one point in the letter, namely, that instead of making a profit the company had actually sustained a loss of £1422. They had not got their 10 or 7½ per cent., and so they said, "the operations of the parliamentary financial year are below the amount allowed by Act of Parliament;" that is, if they could get 10 per cent. they would, and the rest might go to the public. The statement was that they were £7700 below the amount allowed, not below the receipts. Although the company might not have made so much in previous half years, it might be depended upon that they had got nearly their 10 per cent.

The subject then dropped.

LEWES WATER-WORKS COMPANY.

The Annual Meeting of Shareholders was held on the 16th inst.—Mr. E. MORRIS in the chair.

The directors report was as follows:—

The directors beg to submit to the shareholders an abstract of the yearly account to Midsummer, 1874, as certified by the auditors. The revenue for the year amounted to £1903 0s. 7d.; the disbursements were £1018 12s. 10d.; leaving for appropriation £884 7s. 9d. After payment of £120 to the holders of preference stock, being the amount of the preferential dividend on such stock, there will remain £764 7s. 9d. for distribution. Of such sum the directors recommend that a dividend at the rate of £7 per cent. for the year, which will absorb £756. be paid to the shareholders, and that the remainder be carried to the reserve-fund, which, including the £52 advanced therefrom last year, will then amount to £202 19s. 1d.

The directors are pleased to report that the company continues to make steady progress. The machinery is in good working order, but the directors regret to state that the same can scarcely be said of the pipes. When the company was originally formed, the mains which were then laid down were found amply sufficient for the supply of the renters, who were then comparatively few in number; but from time to time, as the renters increased, it became necessary to substitute at various places mains of a larger size, the cost of which was then defrayed out of the ordinary revenue. The demand for the company's water has so much increased that considerable difficulty exists in affording a sufficient supply, owing to the smallness of some of the mains. The directors have given the subject their anxious consideration, and it seems to them that the time has arrived when, with a due regard not only to the renters, but also to the interests of the company, it has become requisite to substitute in several places mains of a larger size for those now in use. This will invoive a somewhat large but necessary expenditure, but one leading to an increased revenue, and therefore the directors recommend that the capital for carrying out such works should be raised, by making, at the annual meeting about to be held, a call not exceeding £2 in respect of each of the new shares which were created at the meeting of the shareholders held on the 5th of October, 1868, but empowering the directors to issue the notices for payment of such call in such sum, and at such time, as they may consider expedient.

By the company's Act the prescribed number of directors is eight, with power to reduce the number to not less than three. At the last annual meeting the place in the direction which had been held by the late Mr. W. E. Baxter was not filled up, and the directors, believing that the number of seven is sufficiently large to manage and superintend the affairs of the company, now give notice that, at the annual meeting to be held on the 16th day of September inst., a proposition will be made to fix the number of directors at seven. The retiring directors this year are Mr. Ebenezer Morris and Mr. George Lenny, who are eligible for re-election, and offer themselves accordingly.

The CHAIRMAN, in moving the adoption of the report, said that as the directors proposed to pay a dividend of 7 per cent., and to carry a further sum to the reserve-fund; he felt justified in reporting that the company continued to make steady progress. For some time there had been a difficulty in affording a sufficient supply of water to some of the company's renters, and with a view to raise funds for the alteration that might be required, the directors considered it desirable that power should be given at this meeting to make a call of £2 in respect of the new shares. He was not prepared to say what extension of mains would be necessary; that was a matter that required and would receive further consideration.

Mr. CROSSKEY seconded the motion.

The SECRETARY (Mr. H. Jones), replying to a shareholder, said the call was limited to £2, as this would raise £960, which was all that was likely to be wanted, at all events for the coming year.

Mr. BROAD said he understood that it was during the dry weather that complaints were made, and that latterly there had been a sufficient supply of water, and asked whether the directors were fully persuaded of the necessity for laying out this extra money.

The CHAIRMAN, in reply, said the difficulty experienced had not altogether arisen from the dryness of the season, though he had no doubt that had made the pressure felt to a larger extent. They had had to contend with the difficulty for some time, and this year it had been found necessary to put such a strain upon the mains, in order to force a supply to extreme points, that a considerable risk had been run of bursting them. The directors would not like to take the responsibility of such a course again. As he said before, they were not prepared to-day to state the exact extent of the alterations which would be necessary. The directors would obtain full information on that point, and perhaps call in a competent person connected with other works to advise them on the matter.

The adoption of the report was then agreed to, and the dividends recommended therein were declared.

Thanks were voted to the board for their services; the number of directors was fixed at seven; a call of £2 in respect of the new shares created in October, 1868, was made; and it was resolved that the sum of 70 guineas be placed at the disposal of the directors for their services during the past year, being an increase of £20 on previous years.

Messrs. C. Parsons and E. Hillman were appointed auditors at the same remuneration as last year.

The proceedings closed with a vote of thanks to the chairman.

BIRMINGHAM WATER-WORKS COMPANY.

The Ordinary Half-Yearly Meeting was held on Wednesday last—Mr. W. JAMES in the chair.

The directors report and statement of accounts were taken as read:—

The directors have to report that the water-rental for the last half year amounted to £41,435 13s. 11d., exceeding that of the corresponding half year of 1873 by £6047 16s. 3d., and that of the half year ending the 31st of December last by £1615 12s. 8d.; the water-rental for the year ending the 30th of June, 1874, exceeding that of the year ending the 30th of June, 1873, by £11,738 6s. 2d.

The profit of the past half year is £22,440 7s. 2d., being more than that of the corresponding half year of 1873 by £5858 18s. 11d., and that of the half year ending the 31st of December last by £3147 4s. 2d., the total profit of the year ending the 30th of June, 1874, being more than that of the year ending the 30th of June, 1873, by the sum of £8943 10s. 1d. The profit of the last half year has been increased by the reduction in the price of coal.

The profit and loss account for the half year ending the 30th of June, 1874, and the balance-sheet of that date, are now submitted to you.

The profit of the past year—viz., £22,440 7s. 2d., and the previous undivided profit—viz., £1166 11s. 9d., make a total of £23,606 18s. 11d. The directors recommend that a dividend at the rate of 8 per cent. per annum, upon the paid-up capital (comprising the original £25 shares, new £25 shares A, and £18 15s. shares B), and a dividend at the rate of 7 per cent. per annum upon the paid-up capital of £10 per share, and £7 10s. per share on the new £20 shares C, and the new £15 shares D, respectively, be this day declared; which dividends will amount to £22,679, leaving a balance of £927 19s. 11d., profit undivided, to be carried forward to the next account.

The directors recommend that the dividends be paid by dividend warrants to be forwarded to the shareholders on the 24th inst.

The whole of the pumping establishments are in good working order, and the wells at Aston, Short Heath, and Perry, continue to yield an ample supply of good water. The directors have deemed it advisable to provide a second engine for the Aston well. The works at Whitacre are now complete, and the water of the river Blythe is being pumped therefrom for distribution. Nearly the whole of the land required for the storeage reservoir at Shustoke has been purchased. The sinking at Selly Oak, referred to in the directors last report, progresses in a satisfactory manner. The additional main, from Aston to Coleshill Street, also referred to in the directors last report, has been laid down. The cost of pumping has been thereby reduced, and the distribution of water to the lower parts of the town much improved. The land required for a high-level reservoir at Erdington has been purchased, and the work will be proceeded with as fast as possible.

It will be satisfactory to the shareholders to know that during the late drought, when many of the large towns of the kingdom were put under a limited supply of water, the resources of this company were found to be more than equal to the extraordinary demand made upon them. Notwithstanding the occurrence of seven fires during the month of July, the large amount of water used for street watering, and the greatly increased demand for domestic purposes, the supply to the public was not interrupted either day or night. The directors, while calling attention to these facts, feel justified in further stating that during the late drought they had not occasion to put into requisition the whole of their resources; which, should the occasion arise, will be found equal to a much more severe trial.

During the past half year forty fires have occurred within the company's district, and in all cases there has been an abundant supply of water. Thirty-six of these fires have been extinguished without the use of fire-engines, partly by portable engines, and partly by water delivered under pressure from the company's mains, and ten have been on premises not supplied with water by the company. The supply of water in cases of fire is always provided by the company gratuitously. The report closes with a list of the streets and roads in which extensions have been made during the past half year.

Dr. — *Profit and Loss, June* 30, 1874. — *Cr.*

Wages current	£1,062	0	5	Water-rents	£41,435	13 11
Salaries	1,771	5	2	Rents of land and cottages	245	19 11
Working engines, and wages	8,186	8	8	Fittings account	433	9 9
Repairs of works	1,256	3	6	Transfer fees	17	19 0
Coals for offices	20	8	5			
Rates and taxes	1,871	4	2			
Interest	3,971	9	4			
Incidental expenses	348	10	5			
Law charges	92	15	11			
Abatements and bad debts	610	6	11			
Remuneration of directors	450	0	0			
Remuneration of auditors and accountant's charges	52	2	6			
Balance, being profit from Dec. 31, 1873	22,440	7	2			
	£42,133	2	7		£42,133	2 7

Balance-Sheet, June 30, 1874.

Proprietors, 4800 shares, at £25 per share	£120,000	0	0	Works, engines, machinery, and land	£768,013	15 4
Do., 4800 new shrs., A, £25 per share called £120,000				Water-rents due from sundry persons	44,142	14 6
Less calls unpaid 25	119,975	0	0	Amount due from bankers and sundry persons	3,597	17 10
Do., 9600 new shares, B, £18 15s. per share	180,000	0	0	Stock of pipes, lead, coal, hemp, and repairing materials on hand	4,186	17 3
Do., 9600 new shares, C, £10 per share called	96,000	0	0	Cash in hand	24	4 9
Do., 9600 new shares, D, £7 10s. per share called	72,000	0	0			
Amount due on loan and interest	192,841	1	5			
Do. due to sundry persons	9,114	14	3			
Do. due for arrears of dividend	102	19	2			
Do. of capital not bearing interest or dividend	3,022	1	6			
Fund for repairs and contingencies, and for bad and doubtful debts	3,302	14	5			
Balance, profit, Dec 31, 1873 £20,269 14 3 Less dvdnd. declared March 18, 1874, at the rate of 6¼ per cent. per an. 19,103 2 6	£1,166	11	9			
Profit, Dec. 31, 1873, to June 30, 1874	22,440	7	2			
	£819,965	9	8		£819,965	9 8

The CHAIRMAN, in moving the adoption of the report, said it required no long speech from him, inasmuch as it told its own tale, and he hoped it would be satisfactory to the shareholders. Any explanation which the shareholders might wish would be gladly given by his colleagues and himself; but there was one point to which he particularly desired to call their attention, as it was one with reference to which they must have been very much pleased—namely, that during the late drought the full supply of water was kept up night and day, while in many large towns the supply had to be diminished.

Mr. D. MALINS seconded the motion.

Mr. C. H. Edwards said as this was the first time that the shareholders had had any intimation about the new reservoir at Erdington, he should like to know its extent and the price of the land. The directors merely stated that the land required for the high-level reservoir at Erdington had been purchased, and that the work would be proceeded with as fast as possible.

The Chairman said he believed the extent of the reservoir was five or six acres. It was only a small one, but the water would flow from it into the lower part of the town, and save the double pumping at Aston.

Mr. C. H. Edwards asked whether the directors apprehended any interference by the South Staffordshire Water-Works Company in reference to the supply given by this company to the parish of Handsworth?

The Chairman said there was no interference with this company that he knew of, and he felt inclined to ask Mr. Edwards why he asked the question. Was he aware that Handsworth was part of their district under the Act of Parliament, the same as Birmingham?

Mr. Cope asked whether there had not been some discussion with the South Staffordshire Company with reference to this matter.

The Chairman: We purchased Handsworth, and that place is as much ours now as Edgbaston. It is conveyed to us under the Act of Parliament.

Mr. J. Atkins asked if the directors considered they would be able to maintain the maximum dividend in subsequent years.

The Chairman said he hoped no shareholder would suppose that he and his colleagues would recommend a dividend of 8 per cent. with the slightest idea of its coming to seven next half year. He entirely approved of the 8 per cent., and he had not the remotest idea that it would fall under 8 in the next half year.

The motion was then unanimously carried.

Mr. J. Watson moved—"That the acts and proceedings of the board of directors since the last meeting be approved and confirmed." He said they had now arrived at their maximum dividend, and, from what they had heard, they had a right to anticipate that very soon they should begin to receive those old arrears, the receipt of which was looming in the distance.

Mr. T. P. Chesshire seconded the motion, and it was adopted.

On the motion of Mr. Malins, seconded by Mr. J. Chesshire, it was resolved that a dividend for the last half year, at the rate of 8 per cent. per annum, upon the paid-up capital (comprising the original £25 shares, new £25 shares A, and £18 10s. shares B); and a dividend at the rate of 7 per cent. per annum, upon the paid-up capital of £10 per share, and £7 10s. per share on the new £20 shares C, and the new £15 shares D, respectively, be declared, the dividend warrants to be forwarded to the shareholders on the 24th inst.

Other formal resolutions having been passed, Mr. J. Atkins moved—"That the best thanks of this meeting be presented to Mr. W. James and the directors for their zealous attention to the business of the company, and particularly to Mr. James for his able and courteous conduct in the chair." The directors had that day presented to them the most interesting and satisfactory report which they had had for nearly 20 years, and for which the company had not paid the full dividend. That day, however, the directors were able to declare the maximum dividend, and the chairman had told them that he had every reason to believe it would be maintained, in which opinion he (Mr. Atkins) fully concurred. For one thing, they might fairly expect that coals would be cheaper and not dearer, while the water-rate could not become smaller, but must gradually increase. He thought they would admit that this was a very healthy and satisfactory state of affairs—satisfactory not only to the shareholders, but highly creditable to the directors. There was no doubt that ability, industry, and time were required on the part of the directors, and at times he could imagine that much anxiety was experienced in the conduct and direction of the affairs of the company, it was also gratifying to know that whilst their capital was being profitably, it was being usefully employed, in supplying this large and important town with that necessity to life and good health—good water. By the wise and good management of the directors, that object, in his opinion, has been attained, and in three particulars—first, the quality of the water was good; secondly, the supply was regular; and thirdly, the price charged was moderate. He thought they might fairly congratulate each other on the state of the company, and give their cordial thanks to the directors, feeling, as he was sure they all did, that the directors were still anxious to do, as they always had done, everything they could to promote the success and the future prosperity of the Birmingham Water-Works Company.

The motion having been seconded and unanimously carried,

The Chairman acknowledged the vote, and, referring to the progress of the company, said that from a statement which he had had drawn up it appeared that in the month of July, 1873, 40 new services were laid on; in July, 1874, the number was 90; thus showing the gradual progress the concern was making. In May of the present year the number was 53; in June, 62; and in July, as he had said, 90. He had also worked out a statement showing the gradual progress of the company for the last 30 years, and it was very extraordinary that their income nearly doubled itself every ten years, being sometimes a few hundreds over and sometimes a few hundreds under. In the early part of 1872 he made out a prospective profit and loss account, and in the accounts for 1874 he prophesied 8 and 7 per cent., and it was astonishing how near the figures had come up to his estimate, being somewhere within £300 of the amount he put down three years ago. Therefore, taking the past as a criterion for the future, they must go up; he did not think they could come down. Owing to the price of coal they were obliged to reduce the dividend to 6 per cent., but the coal had since been lowered, and that had very much increased their profits last year. He had no doubt they would be assisted during the present year by the reduced price of coal.

Mr. C. H. Edwards then moved—"That in appreciation of the long and valuable services rendered to this company by our esteemed chairman, Mr. W. James, it would be gratifying to the proprietors if he would kindly allow his portrait to be taken and hung in the board-room."

Mr. C. R. Cope seconded the motion, which was supported by the shareholders, and unanimously adopted.

Mr. James consented to the request of the shareholders, and the proceedings terminated.

Steam-Pumps.—We notice that Messrs. Hayward Tyler and Co., of Whitecross Street, have been again successful with their "Universal" steam-pump, in an open competition held at Lille, the centre of manufacturing industry in the North of France, the "Conseil Agricole de Lille" having awarded them a handsome gold medal. These pumps appear to find increasing favour in the eyes of manufacturers and mining companies.—*London Iron Trade Exchange.*

Elgin.—Proposed Transfer of the Water-Works to the Corporation.—A meeting of the inhabitants was held on the 11th inst., to consider this question. It was stated by the chairman—Provost Cameron—that the water company had spent £11,000 in providing a supply of water for the town. For a good many years they had been paying a dividend of 6 per cent., and had paid off a considerable amount of debt. At present the capital stock consisted of £8000 in shares, and £1000 of debts, towards which they had £600 in hand. They also expected by the end of the next financial year to have a surplus of £200, so that at the close of the year the stock obligations and debts of all kinds would amount to about £8250, and this the corporation were offered for the payment of a perpetual dividend of 6 per cent. on the capital. The works, which actually cost £11,000 twenty years ago, would now, owing to the increased price of iron and labour, cost about £15,000. If the purchase were effected, the corporation would in a few years reduce the rate from 1s. to 9d. After some discussion on the proposition, it was finally agreed to that Mr. Leslie, engineer, Edinburgh, should be engaged to examine and report as to the value of the water company's stock, and then a *plébiscite* will be taken of the public opinion on the question.

NEWCASTLE AND GATESHEAD GAS COMPANY.

NEW GASHOLDER AT REDHEUGH.

With the present number of the Journal is published the third of the series of five lithographic copies of the working drawings, prepared by Mr. V. Wyatt, for this gasholder; and we continue our description from the Journal of the 8th inst.

The dome of the upper gasholder is trussed with eight main rafters, as shown on the plan of framing, stretching from the upper curb to the centre of the dome. Four of these rafters, named "main cross rafters" on plans, cross each other at the centre of the dome, and are secured together and between the two centre plates. The main rafters spring from eight of the posts at the level of 18 feet 6 inches above the underside of the lower curb, and are of the form shown on the drawings. The depth of the main rafters at the springing line at the curb is 12½ feet, being rounded to a quarter circle at the curb end, and running into a depth of 1 foot 6 inches for the central portion, and 2 feet under the middle of the dome. These rafters are built to exact curves, so that when all was fixed, they assumed the curve shown on drawings, having a chord of 147 feet 4 inches, and 7 feet 3 inches rise. To accomplish this the contractor was required to allow sufficient camber in the erection for any deflection in the rafters after the supports were released.

Each top and bottom flange for four of the main rafters is made of two angle-irons, each 3 inches by 3 inches by $\frac{5}{16}$-inch. For the remaining four main cross rafters which intersect each other at the centre of the dome, the angle-irons of the flanges are 3½ inches by 3½ inches by ⅜-inch, and are continued down the side posts to the lower curb. The webs of all the main rafters are ¼-inch thick, of the several depths shown. The specification provided that the angle-irons should not be of a less length than 20 feet, to break joint with each other at least 3 feet, and to have covers of the same section as themselves, 2 feet 8 inches long, and four rivets on each side of the joint. The web plates, 1 foot 6 inches deep, for the central portion of rafters, are of a length to reach between the double stiffening vertical T-irons, 4 inches by 2 inches by ¼-inch, as shown, which cover the joints. There are double T-irons to the webs, each 5 inches by 2½ inches by $\frac{5}{16}$-inch, on the radial lines at haunches of rafters, riveted over, and well secured to webs and flange-irons, the other radial joints to haunches being double strips, 4 inches by ¼-inch.

The top flanges of all main and secondary rafters are secured to the L-iron of the top curb by being cranked under the same, and also riveted to the first tier of top plates with ⅞-inch rivets at 4-inch centres. The main rafters are secured at the centre of the dome between two circular plates, 8 feet diameter, spaced 2 feet apart, and ½-inch thick. The four main cross rafters intersect each other, and go right across the dome between the plates, and the four other main rafters are secured between the jaws of the same plates by ten ⅞-inch rivets at top and bottom—20 rivets in all—having a bearing of 1 foot 6 in., as per detail drawing.

The secondary rafters are eight in number, and span from the outer curb of the upper gasholder to the concentric girder, A, as shown on the plan, alternating with the main rafters. They have similar flanges to the four main rafters, and are connected to the web of the ring-girder, A, by two ⌐-irons, each 2½ inches by 2½ inches by $\frac{5}{16}$-inch, and a strip at the back 6 inches by $\frac{5}{16}$-inch, all riveted together. The lattices are 4 inches by ¼-inch, secured to flanges at each end by two ⅞-inch rivets.

The tertiary rafters are T-irons, 5 inches by 4 inches by ⅜-inch, and secured to the ring-girders, A, B, and C, by connecting plates 1 foot 9 inches by 11 inches by ⅜-inch, and on the top flanges by ten ⅞-inch rivets to each pair. At the outer curb-end they are riveted by ⅞-inch rivets, at 4-inch centres, to the first tier of top plates, by the top flange, similar to the main rafters.

There are four circles of tension-bars concentrically placed from the centre of the dome, of ⌐-irons, 2½ inches by 2½ inches by $\frac{5}{16}$-inch. They are connected to the flanges of the main, secondary, and tertiary rafters by corner straps 6 inches by 6 inches by 2½ inches by $\frac{5}{16}$-inch, and four ⅝-inch diameter rivets. The upper surfaces of all tension-bars are kept truly in line, and flush with the tops of all the rafters, as shown in details.

The plates of the first row for the top of the gasholder, next the curb, are 3 feet wide by $\frac{5}{16}$-inch thick, riveted to the curb, main, and tertiary rafters over the entire width, with butt joints, cover strips 7 inches by $\frac{5}{16}$-inch, and double zig-zag rivets. The plates of the second row from the curb are 3 feet wide by ¼-inch thick; and the third row of plates 3 feet wide by $\frac{3}{8}$-inch thick, lap-jointed. The centre plate is 8 feet in diameter, and ½-inch thick, attached to the next row of plates by a butt joint and a cover strip 9 inches by ½-inch, double riveted and zig-zagged, and also secured and riveted to the ⌐-irons of the main rafters. The first row of plates from the centre plate is about 3 feet wide by ⅜-inch thick; the second row also about 3 feet wide by ⅜-inch thick; the third row 3 feet wide and $\frac{3}{16}$-inch thick; and the remaining plates not previously described, between the curb and the centre, ½-inch thick, of an area of not less than 10 superficial feet each. The whole of these plates, not otherwise specially defined, are lap-jointed, and in accordance with the previously described stipulations as to plates, laps, rivetings, &c., and cut to radial lines, following the true curve of the dome.

The drawing accompanying the present number gives an elevation of the framing, a detailed description of which must be reserved.

A Strike for Water.—A strike with a novel object is reported as having taken place at the Trendon Collieries, Durham. The miners have adopted the advice of a clergyman, and have struck for water and decency. They have given their employers notice that they have suffered almost a martyrdom from want of water for drinking and domestic purposes; that their complaints had at first been unheeded, and then put off from day to day; that Acts of Parliament, backed by Government Local Boards in London, were treated as dead letters, and winked at; that it was time to see what the men could do in the matter by pressure of a strike; and that unless water and decent accommodation were allowed, they would no longer work or pay rent. They threw down their tools, and the mine-owners are now looking out for water. The men and their families number, it is stated, some 3000 altogether.

Sanitary Laws Amendment.—One of the last acts of the late session was to amend and extend the Sanitary Laws. There are 59 sections to explain and amend the laws on the subject. Among the provisions is the following:—"Every sanitary authority may make bye-laws, to be confirmed by the Local Government Board for regulating the lodging and other treatment of persons engaged in hop-picking in the district of such authority." The Local Government Board may make regulations as to the ventilation of common lodging-houses, the separation of the sexes, and precautions are to be taken to prevent diseases. On representation to a nuisance authority that water in a cistern or other place is polluted, and likely to be used for domestic purposes, a summons may be issued and a portion of the water analyzed. This provision extends to wells, cisterns, &c., public or private, the water in which is suspected of being injurious to health.

Solihull Gas Company.—The annual meeting was held on the 11th inst.—Mr. G. Beard in the chair. The balance-sheet produced showed that the receipts for the year amounted to £958 8s. 5d., and that, after deducting expenses, there was a balance available for dividend of £48 4s. 3d. The directors recommended a dividend of 5 per cent., which would leave over £22 to be carried forward. The chairman, in declaring the dividend, said it was less by 1 per cent. than that declared last year, but this was owing to the increased cost of raw materials. He congratulated the company on the condition of their works. A more favourable contract had been made for the present year's coal, and, with an increased consumption of gas, he hoped to see the old dividend restored. The dividend would be payable on the 29th inst., and he hoped the shareholders would be satisfied with it, as, under the circumstances, they ought to be. A vote of thanks was passed to the chairman, and the proceedings terminated.

WALSALL GAS SUPPLY.

PROPOSED TRANSFER OF THE WORKS OF THE COMMISSIONERS TO THE TOWN COUNCIL.

On Tuesday, the 15th inst., a special meeting of the Walsall Town Commissioners was held for the purpose of considering the above question.

The MAYOR (Mr. R. W. Brownhill), who presided, said the first business was to consider a subject which had been before the council and commissioners several times during the last year, viz.—"On what terms and conditions the commissioners will agree that the gas-works, with all the plant and other property and assets thereto belonging (the whole of which is the exclusive property of the ratepayers within the commissioners or town district), shall be transferred to the ratepayers throughout the entire municipal borough, in the event of the Town Council promoting, in the ensuing session of Parliament, a bill to effect such transfer, and to vest the gas-works, &c., in the Town Council in lieu of the commissioners; and whether one of the conditions of the transfer shall be the addition to the present gas-works debt (which is about £11,000) of the following other sums—namely, the sewer debt and commissioners other debts of about £21,000—thus making the total gas-works debts £32,000." There had been a general desire, in the course of the discussions which had taken place, to use the gas-works for the benefit of the whole municipal borough, and to acquire the plant within the district belonging to the Birmingham and Staffordshire Gas Company. The company were now willing to sell this plant, the only question being as to the price, which was also the only question in the other branch of the subject—viz., the terms upon which the gas-works should be transferred from the commissioners to the council. He hoped they would discuss the matter thoroughly, and believed it was within their power to devise a scheme which would be equitable and fair to all parties.

The TOWN-CLERK then a read a valuation which had been made of the gas-works, the total of which was £53,660, not including the plant in the new district outside the old commissioners limits, and basing the valuation upon the price of things four years ago. If the present prices were taken, the valuation would be increased by about £7000, showing a total of £60,000. Even this did not represent a full value of the works, which had been kept in good sound working condition in every department. If the contract entered into by the Birmingham Corporation for the purchase of the works of the Birmingham and Staffordshire Company was to be taken as a fair criterion, the works belonging to the Walsall Commissioners were worth upwards of £100,000; or, to adopt another mode of estimating the value of the concern, if they were to sell the works to a company, charging the same prices as the Wolverhampton Company, there could be no doubt such a company would be willing to give £70,000 or £80,000, and would be able to pay a dividend of 7½ per cent. upon that, taking no account of the prospective increase of trade and value. An expenditure of £12,000 would make the works suffice for the extended district for five years.

The MAYOR then proposed a resolution for the transfer of the gas-works from the commissioners to the council, so that the concern might become the property of the ratepayers throughout the whole municipal borough, including Bloxwich, Blakenall, Goscote, Bescot, The Pleck, New Mills, Palfrey, and other outlying districts, on condition, first, that all the debts, amounting to about £32,000, should be regarded as gas-works debts, and be charged on such works; the difference between the value of the works and the amount of the debts (to be ascertained by Lieut.-Col. Cox in public court, or by such other person as the Local Government Board may appoint) to be paid by the ratepayers within and without the old district, in proportion to the rateable value of their respective properties, by such an annual sum as, spread over twenty years, shall discharge the principal and interest; such sum to be provided, in the case of the consumers in the outlying or new districts, by an addition to the price of gas over and above that paid by the consumers in the old or town district.

Mr. AULTON seconded the proposition, considering the scheme one of the most suitable that could be devised. It was only reasonable that if new partners were taken in they should bear a share of the existing liabilities in return for the benefits they would receive.

Mr. LINDOP opposed the proposition. In the first instance, the works were in the wrong place—a place which precluded extensions, and involved an expenditure of £700 in the carting of coal from the station. Next, Lieut.-Col. Cox was not a practical man to make the valuation. Next, they would have to buy useless plant from the Birmingham Corporation, in the shape of the Birmingham and Staffordsiire Company's mains, which in many parts of the district ran alongside the commissioners mains. But for the unfortunate alliance with Walsall, the Bloxwich people would have opened negotiations with the Birmingham Corporation for the purchase of the Birmingham and Staffordshire mains at Bloxwich.

Mr. CHECKLEY also opposed the proposition. If the gas-works were of any value, the consumers in the old district had had the benefit in the gas, which had been sold at the lowest price consistent with profit, and it was wrong to attempt to tax the new consumers for the benefits which the old ones had received. The works were estimated to be worth £50,000, but a large part of that was made up of the cost of re-erecting different parts, and it would be necessary to seek land elsewhere for an extension, for the expense of which the ratepayers in the new districts would have to bear their share of the responsibility. For these reasons, coupled with a dislike to the matter being referred to an unpractical man like Lieut-Col. Cox, or to any one sent down by the Local Government Board, he opposed the scheme.

Mr. EVANS supported the proposition, which was opposed by Mr. ABBEY for various reasons, and by Mr. WILLIAMS on the ground that it was an attempt to unfairly saddle the ratepayers in the outlying districts with £21,000 of debt.

Mr. BREWER suggested that two or three gentlemen on each side should retire into the anteroom and endeavour to effect a settlement.

Mr. HOLDEN supported the motion as being most equitable to all parties. Looked at as a business transaction, it was only fair that those who were to become partners in a concern worth £50,000 should pay a just share of the value of the concern. No doubt the persons living in the old district had had the benefit of cheap gas, but they had also had all the risk of the concern; and the proposed alteration would not be to their benefit, since, if they could carry on the works as at present for a few years, gas would no doubt be cheaper still, while if they took in the outlying districts, it must be dearer, owing to the cost of plant. It seemed to him that Bloxwich wished to reap an undue advantage. Then why not accept a scheme which provided for the introduction of a disinterested person to say what was fair?

Mr. THOMAS also opposed the scheme. The outlying districts would be saddled with about £7000, towards which Bloxwich would have to pay £4000, or thereabouts. That amount he considered the Bloxwich ratepayers had contributed over and over again, for, in the first place, they had never had a fair share of the borough police. Then they had contributed something like £70 a year towards the free library, without an equivalent return, and they had built a cemetery for Walsall. If an independent accountant went into the matter for thirty or forty years, a considerable balance in favour of Bloxwich would be shown, so that really the ratepayers there were the aggrieved parties.

Mr. STANLEY would have been glad to see the whole matter deferred for twelve months, by the end of which time the Birmingham Corporation would perhaps be in a better position to make terms with them as to the acquisition of the plant of the Birmingham and Staffordshire Company, while, if they promoted a bill this year, they would no doubt have the strenuous opposition of that company. As to the profit derived from the works last year, it was only £900, which was not 4 per cent. upon the money invested. If the mayor's proposition were carried, and they purchased the plant of the Birmingham and Staffordshire Company, they would have to expend probably £100,000, the interest upon which, at 4 per cent., would amount to £4000, so that if their earnings continued at the same rate as last year, there would be a loss of £2000 per annum, and the price of gas would have to be raised. He proposed, as an amendment—"That, taking into consideration the fact that the proposition now made by the mayor for the first time is of such importance, it is expedient that the subject be again referred to the committee."

Mr. THOMAS seconded the proposition.

Mr. BREWER said that there seemed no chance of a settlement being come to, and he therefore proposed, as another amendment, that the matter stand over for twelve months, thus letting the blame of the mistake—for it was a mistake not to close with the motion—fall upon those who opposed it.

Mr. HOLDEN seconded this amendment, which was supported by Mr. BUTLER.

The MAYOR said that, seeing the spirit in which the matter had been dealt with by certain parties, notwithstanding his desire to act fairly by and for the benefit of all, he would withdraw his resolution. In reply to the objections which had been advanced, he would take the opportunity of saying, however, first, that the position of the works did not involve an extra expense of £700 a year, but only about half that amount; next, as to the profits having been only £900, that if they had charged the same price for the gas as the Wolverhampton Company had done, the profits would have been £3000, and if the same price as the Birmingham Company, £6000. And, next, that the company's mains, which had been spoken of as useless, would be fully required in five or six years.

The vote was then taken, when there appeared—for Mr. Brewer's amendment, 14; for Mr. Stanley's amendment (which now became the substantive motion), 5. The former was accordingly declared carried.

A Special Meeting of the Walsall Town Council was held on Wednesday evening, for the purpose of considering several questions relating to the proposed transfer of the gas-works from the commissioners to the council.

The MAYOR, who presided, said that after the decision of the commissioners on the previous night, that the matter should be adjourned for twelve months, he thought there was nothing for the council to do but also adjourn for the consideration of the subject.

Mr. AULTON proposed a resolution to this effect, which was seconded by Mr. WEDGE.

Mr. CHECKLEY said he should like it to be understood, before the matter was finally abandoned, that those who objected to the scheme on the previous night were not responsible for the adjournment. Knowing the crying evil as to the non-lighting of the thoroughfares at Bloxwich, and the great difficulty which would arise with the ratepayers, they were very anxious for the scheme to be carried out, if it could have been done in common fairness to the outlying districts.

Mr. LINDOP also agreed that the responsibility of the adjournment did not rest with those who objected to the scheme, but with the mayor and those who acted with him.

Mr. DERLEY said no one would have benefited by the scheme more than the ratepayers in the outlying districts, and he regretted that, for the sake of £6000 or £7000, which was what those districts would have to pay, the matter should have been shelved for twelve months.

The TOWN-CLERK said that any opposition which the council or commissioners might take to the scheme of the Birmingham Corporation would be considerably weakened by the adjournment of the matter.

Mr. STANLEY, on the part of the representatives of the outlying districts, also disclaimed any intention to prevent the carrying out of the scheme, stating that their desire was simply to obtain equitable terms. He proposed, as an amendment, that the subject be referred back to the committee.

Mr. LINDOP seconded the proposition, and after some further discussion a vote was taken, when there appeared—for a reference to the committee, 7; for an adjournment for twelve months, 4. The former was therefore declared carried.

NEW CORPORATION GAS-WORKS AT DEWSBURY.—On Thursday last, the Mayor of Dewsbury (Alderman Day) gave a banquet, at the Royal Hotel in that town, to the members of the corporation and other officials, to celebrate the cutting of the first sod of the new gas-works, at Savile Town. The importance of having additional gasholders, retorts, purifiers, &c., was referred to, and it was shown that, when the new works are completed, to what extent the borough would benefit. The district of supply includes Dewsbury proper, part of the township of Soothill, and the whole of Thornhill and Savile Town. The new works will be situated near the Dewsbury branch of the Calder and Hebble Navigation Company's canal at Savile Town, and on the north-east side of the Lancashire and Yorkshire Railway, at the junction of the local line with the main system. At the entrance there will be offices and store-rooms, foreman's house, and stables. The works are designed to produce one million cubic feet of gas per day, and are so arranged as to be capable of being developed to a daily produce of three times that quantity. The retort-house will be 200 feet long by 600 feet wide internal dimensions, and be covered with an iron roof in one span. This house will have its own condensers. There will be a coal store capable of containing 3000 tons, placed parallel to the retort-house now to be constructed, and will be available for the others when built. Coal may be brought into the works by canal or railway, and steam is to be used for loading coal, coke, &c. Suitable buildings will be provided for the reception of engines, exhausters, and pumping apparatus, boilers, &c. The purifying-house is to have an iron roof, and in close proximity to it will be erected a structure to contain station-meter and governors and testing apparatus. The works have been designed by Mr. Craven, the corporation's engineer and manager, under whose supervision they will be erected. Mr. Biddle, borough surveyor, will take charge of and prepare plans for the buildings.—*Leeds Mercury.* [We have received a more extended notice of these works, which we shall find room for next week.—ED. J. G. L.]

BLANTYRE WATER SUPPLY.—During the late miners strike, a good deal of bitter feeling was expressed in regard to the absence of a proper supply of water for the use of the Blantyre miners and their families. The only source was a water-course or water-drain, into which the sewage from the premises of an adjoining proprietor (Mr. M'Gregor, Hyde Park House) was discharged. The complaints were so numerous and urgent that the sanitary inspector, with the concurrence of the local authority of the parish, presented a petition under the Public Health Act to the sheriff at Hamilton, craving his lordship to prevent Mr. M'Gregor from emptying the sewage into the stream. From the statements made at the court on Friday week, it appeared that the drain or stream in question furnished from 150 to 200 families—almost if not exclusively miners families—with their domestic supply of water. They had but recently come to Blantyre in connexion with the opening up of new pits, and houses had been put up without reference to water supply, a practice which the sheriff incidentally brought under the notice of mine-owners, whom he referred to the 2nd sub-section of the 89th section of the Public Health Act. He added that even assuming the respondent had a right at common law to discharge his drainage into the water in question, and that miners, therefore, had no right at common law to use it, except as polluted, still, if the effect of permitting this to go on was to imperil the sanitary condition of the community, it might be held that it was entitled to be stopped under the authority contained in the Public Health Act. The great difficulty felt by the respondent was as to the disposal of the sewage, a difficulty which would not arise if there was a drainage district or a sewer provided by the local authority of the parish. After a long proof, his lordship directed Mr. Watson, sanitary inspector, Hamilton, to inspect the premises and sewage referred to, and to report in what manner it might best be disposed of without escaping or flowing into the water-course or water-drain set forth in the petition.

ON THE GEOLOGY OF COAL AND COAL DEPOSITS IN THE BRITISH ISLANDS.

By R. ETHERIDGE, Esq., F.G.S., &c., Royal School of Mines, London.*

[A Lecture delivered before the British Association of Gas Managers, June 11, 1874.]

Mr. President,—There is no question which affects the welfare, the prosperity, and the greatness of Britain so much as that of her coal-fields and coal resources; and I presume there is no body of men in the kingdom who have paid more attention to this question than those present this evening. I feel, therefore, very diffident in addressing a meeting composed, as I take it to be, of men who have not only a large interest in, but who have devoted much time and consideration to this subject. But when asked to deliver a lecture on the geology of coal, I felt that perhaps I could manage to add some new matter for thought. Had I been asked to lecture on the question of the peculiarities of coal, of the varied qualities and conditions which constitute its chief value for your retorts, or other questions connected with the chemistry of coal and other gas matters, I should have refused. But this question of the geology of coal is one to which, with others, I have paid some attention for many years, and therefore consented to deliver the following lecture, which I trust may find a place among others in your proceedings, and be acceptable on this occasion.

You are aware, sir, that on June 28, 1866, a Royal Commission was established for the purpose of investigating the question of the probable duration of our coal resources, the quantity of coal in Great Britain, the mode in which it is worked, and all those matters connected statistically with this subject, which so deeply concerns the welfare of the people of Britain. The Duke of Argyll was the president of that commission, and some of the most practical men in the kingdom were examined as to the future condition of our country with relation to our coal supply, and coal-fields, and perhaps £30,000 was never better spent than in the inquiries instituted and published by that commission.

In July, 1867, the commissioners met, and periodically sat for five years. Those who are in the habit of consulting "Blue-Books" will find in the three volumes some of the most important facts and detailed statements relative to coal and its future ever communicated to the people of this country—matter, indeed, of vital interest as affecting the future of Great Britain, whether we refer to her countless manufactures, the supply of her mercantile and steam navy, the production of pig iron, the making of gas, her household supply of coal, and all those arts and manufactures which are based upon the application and supply of coal as a fuel.

I propose, therefore, to bring before you some facts connected with the coal and coal-fields of Britain, past and present.

Doubtless there are many present who know more respecting the structure of individual coal-fields than myself. On the other hand, there may be many who know little relative to the mineral resources and general structure of England.

Now, the geology of coal is a very important question, and is a subject to which every man engaged in any business or pursuit connected with the arts and manufactures should pay some attention. But I am sorry to say it is a study which has been, and still is, greatly neglected in our schools and general education; so with physical geography, with which it is so closely allied.

Geology is simply nothing more than physical geography, applied to and brought to bear upon the past or ancient history of the globe; and any who will apply the laws of existing phenomena to the structure of the earth through time, will have no difficulty in unravelling the history of his own country.

The area or land on which the British Islands stand is an elevated yet submarine plateau or plane, extending westward from Ireland some 100 miles, to Holland on the east, north to Scandinavia, and south to a deep region west of France and Spain.† The western face of this plateau, now beneath and covered by the Atlantic, has a steep and precipitous slope to the profound depths of that ocean.

It is on this plateau that all those changes of level and oscillations, great and small, have taken place, and on which have been modified the shape, size, and life of the British Islands through all time, and by which we have been united and apparently severed countless times from the main continent. The Irish Sea and German Ocean now, are but, the one a shallow, and the other a deep hollow in the land, filled by the waters of the great ocean. An elevation of the bed of the German Ocean, or the plateau, 100 feet would unite us to Europe again on the one hand, and 300 or 400 feet would once more again unite England and Ireland. A depression of one-eighth of a mile, or 600 feet, would render us an extensive archipelago, when nearly the whole of the centre of England would be submerged. The Welsh and Cambrian mountains, and the Pennine chain and Scotland would stand out as islands; the latter in three separate regions, N.E. to S.W. The Hebrides, Shetlands, and islands off the west coast of Scotland are only outlines from the mainland—evidences of change, mountains in the sea, the valleys being pasture land and feeding-ground for the dwellers in the ocean; yet, if the land were elevated but a few fathoms, they would no longer be islands. It is, then, upon this plateau that our coal-fields had their origin, growth, and development; movements or oscillations, by depression and elevation greater than the depth of the Atlantic, which now border our western coast, did then, and have since, repeatedly occurred, and all the phases in the physical life and history of the British Islands have been governed and modified upon the extensive submerged plans between the 300 fathom level off the coast of Ireland and the flats of Holland and Belgium. Such changes are still in action, though slow and certain. The standard of measure for these movements (the sea level) never changes; it is relative only. It is the land, the defined margin of the coast, which is the index or vernier to those upward or downward movements or oscillations which unceasingly go on; time only is required to do all that has been done before, to destroy and build up, to rearrange new land through the destruction of old. The ocean is at once the destroyer and preserver. Mud and sand (lime, clay, and silica) are still the agents, under physical, mechanical, and chemical laws, that have, still do, and ever will form or constitute the solid basis of future continents. Life plays its part along with, and side by side, these changes, being itself governed by physical laws, and is one, if not the chief, agent in the construction of nearly all the solid limestone strata of the globe, through vital agency alone; the accumulation and indestructibility of certain organic remains, formerly inhabitants of our seas, where then, as now, being converted into rock masses under the laws of conservation and deposition. This action or condition of things has been in progress from the earliest geological times and history of the British Islands, and will ever continue, being still guided by those unerring and certain laws which govern the material universe.

The geological position of coal and the coal measures in the British strata is important to understand; and, without entering into geological technicalities, I presuppose that every one present is able to follow me.

Suffice it to say that the Coal-measures and the Coals that especially or essentially interest, and that are of economical value to you, belong to that division or group of strata termed upper palæozoic, and rest, as a rule, upon the Carboniferous Limestone, although they may rest upon any group of rocks older than itself, such being the case in the South Staffordshire coal-field, where the coal measures rest at once upon the Wenlock rocks of the upper silurian series, and in Shropshire upon the Cambrian. In other words, these were the old land areas on which grew the particular plants, which, after growth and subsequent decomposition, were converted into coal, or were carbonized on the spot where they flourished. The many agencies concerned in the deposition of the strata, and chemical changes which the vegetation underwent, to its complete or final metamorphism, are matters foreign to my purpose now to enter upon; but, as a rock formation, a great and wonderful life period, both concerned in producing a product of immense economic value to man, it stands alone. Regarded lithologically, or as a rock formation or system, it is composed of sandstone shales, fire-clays, ironstones, limestones, and coal, more or less alternating with each other, and in many areas or coal-fields as much as 8000 or 10,000 feet in thickness.

I need hardly say that the formation or accumulation of such a series of stratified deposits, and the conversion of vegetable matter into almost pure carbon or coal, implies a long epoch of time, or lapse of ages, with many and frequent changes in the relative levels of sea and land, some being laid down in deep water, others in shallow—some of fresh-water origin, others marine—these conditions being fully exemplified by the fossil contents of the intervening sandstone or shales over many of our coal-fields and those of Europe; and we doubt not that the coal measures and underlying carboniferous limestones were deposited and accumulated amongst an extensive archipelago, of which much of Scandinavia, Scotland, Ireland, Wales, England, France, Belgium, Prussia, and Italy formed parts (and doubtless Nova Scotia was an extended westerly portion of the same); and an important feature of this archipelago was a continuous tract of land, reaching from the Franco-Belgian and Prussian frontier to Somersetshire and the South of Ireland; still recognized in the Ardennes to the east and the Mendip Hills to the west. All this area exhibits similar physical characters.

We may therefore divide the several greater groups of the carboniferous period into four conditions or series—1. *The upper or true coal measures*, which were chiefly, if not entirely, terrestrial or land conditions. 2. *The millstone grit* (arenaceous or sandstone series), chiefly littoral and shallow-water deposits, with little or no coal. 3. *The Carboniferous or Mountain Limestone*, deposited under purely marine conditions, probably rather deep water, and containing a numerous assemblage of fossils, entirely marine, with extensive masses of reef and other corals distributed through the mass. 4. *The lower coal measures or carboniferous shales*, which were laid down in shallow water, and perhaps amidst low and swampy lands and islets. Such conditions are still known in the swamps of tropical countries, where the decaying vegetation mixed with sedimentary matter—both silicious and calcareous—have all the general appearance and condition of the old coal epoch, except that the peculiar vegetation of that remote period now no longer exists. True coal occurs in beds or seams of every thickness, from 1 to 30 feet, divided or separated from one another by thicker or thinner strata of shale, sandstone, clay, &c., the whole called (collectively) coal measures. These intervening strata may be either of marine or fresh-water origin, depending upon the position of contiguous land with regard to the water and successive periods of plant growth and decomposition and slow and continued depression of the area over which coal growth and associated conditions were going on. The carboniferous formation of the British islands assumes various characters, yet all of one general type or facies, each great area or tract having its own peculiarities, due to conditions during growth, and subsequent physical and chemical changes. Thus, we have Cannel coals peculiar to one, Anthracite to another, and Bituminous coals to another area; yet, originally, all resulted from the growth and decay of one floral type. So with all Europe and America, the same conditions were universal, and the coal and coal measures were produced in one long and continued, and, perhaps, unbroken period or age over the globe, though not absolutely contemporaneous everywhere.

Now, in England and Scotland, we have a vast succession of measures, and an almost unlimited supply of coal, and, perhaps, with the exception of America, more than all Europe combined. The aggregate area underlaid by the vast coal-fields of America amounts to 200,000 square miles, or 20 times the area of all the remaining coal of Britain and Europe, and a store of 4 billion tons of fuel, assuming or calculating for only 20 feet of coal. If, therefore, coal as a source of motive power is to remain the dominant element, and all mechanical industry is to bend to, or be governed by it, America has, indeed, a great future for her people. I do not mean to infer that coal is always to be the dominant power, though at present we know no other. Chemistry may, through the toil and research of science, yet discover some motive power that will do away with the necessity of the consumption of such millions of tons as are now raised and consumed (much to waste). At the present moment, however, we are, as a nation and people, dependent for our supremacy in the world upon this one power—coal.

Coal Tracts, or Areas.

There are in Great Britain and Ireland 10 districts where coal-yielding rocks come to the surface, and no less than 39 smaller coal areas—17 in England, 16 in Scotland, and 6 in Ireland.

The following are the 10 districts, or chief areas:—1, Northumberland and Durham; 2, Whitehaven; 3, Yorkshire, Nottingham, and Derby (Midland); 4, Lancashire; 5, North and South Staffordshire; 6, Flintshire; 7, Shropshire; 8, Forest of Dean; 9, Bristol coal-field; 10, South Wales.*

The smallest of these contains an area of 60,000 acres, and the largest 600,000 square acres; and the entire known acreage in England equals 2,500,000, and Scotland 1,000,000 square acres; or there are 6000 square miles of coal land in Britain, or a total of 4,050,000 acres.

In Scotland five areas are recognized of considerable magnitude, and these are divisible into 16 coal-fields. The five areas are—1, the Lothian; 2, Fifeshire; 3, Clackmannan and the Clyde basin; 4, Ayrshire; 5, Lesmahago.

Ireland possesses only six tracts or fields—1, Antrim; 2, Dungannon; 3, Tipperary; 4, Kilkenny; 5, Tyrone: 6, Clare, Limerick, and Cork.

These coal-fields are separated at the surface by the overlying horizontal strata of New Red Sandstone, and sometimes, as in the Bristol coal-field, by the succeeding Lias and Oolite. They are, however, connected underneath, or were so originally at the surface, or at the time of deposition or growth. The divisions into now so-called fields, are, however, frequently due to physical causes, such as great flexures of the strata, faults, and denudation subsequent to these movements. As examples, we may mention the great coal-field of South Wales, the Forest of Dean, and the Bristol coal-fields, which unquestionably were once united or originally one coal-field, since separated by great flexures and folds and immense denudation of nearly all the strata once overlying the whole. The strata comprising the Welsh coal-field is nearly 10,000 feet in thickness, and the Bristol coal-field 6000 feet, and much of the coal in the latter will never be reached or realized, owing to its depth and the physical structure of the basin.

Again, the South Staffordshire and Worcestershire coal-fields are nearly related, if not one and the same, at considerable depths; and the Durham, Newcastle, Yorkshire, Lancashire, Derbyshire, Nottinghamshire, Leicestershire, and Warwickshire fields have many features in common, and, if laid bare, or all the superincumbent strata removed down to the old land surface, it probably would appear as one great terrestrial tract—the original surface, and over which the coal-flora flourished, decomposed, carbonized, and became fossilized. The more northerly or Scotch coal-fields have peculiarities of their own, both as regards the coals and their earlier development or growth, as well as the rocks which contain them; for by far the greatest part of the workable coals or coal series of the Scottish fields is included in the limestone group (either

* The delay in publication of this lecture has arisen from the necessity of having the report revised by Mr. Etheridge, to whom, as will be seen by those who were present at its delivery, we are indebted for some very extensive and valuable additions.

† Large diagrams of Britain and this plateau were shown.

* The most important and largest are the five following:—1, Newcastle and Durham; 2, Lancashire; 3, Yorkshire, Nottingham, and Derby; 4, South Staffordshire; 5, South Wales.

the carboniferous limestone series or the calciferous sandstone, &c., below). The important fields of Lanarkshire and Ayrshire, with their fine gas or parrot coals, splint, and black bands or beds of argilo-calcareous iron, all occur in a group of rocks in which coal was accumulated prior to much of the English having commenced.

Ireland, although now so poor in coal, is, nevertheless, one-half covered by *rocks of the carboniferous system*, such as the Carboniferous or Mountain Limestone and lower coal measures; yet, comparatively speaking, Ireland scarcely possesses or produces coal in any quantity. The coal measures of the south of Ireland resemble the western extremity of South Wales, and those of the north of Ireland the north of England deposits. Doubtless they also were once one continuous terrestrial surface.* This may also be said relative to our original connexion with the European continent, especially that portion belonging to the Belgian, Westphalian, and French areas—notably to the former—and over the region now occupied by the German Ocean and part of the English Channel. The Belgian coal-field extends into and constitutes a part of France as far as Valenciennes, occupying a "long and narrow trough from Aix-la-Chapelle to Liege, Namur, Mons, Valenciennes, and Arras; and we believe, upon physical grounds or evidence, that the coal measures trend westwards beneath the cretaceous rocks to within 30 miles of Calais. And it is the opinion of many physicists, especially Mr. R. A. Godwin Austin and Professor Prestwich, that the Belgian and French coal-fields might possibly extend beneath the south-east part of England. The former of these distinguished geologists has shown that the coal measures of or near Therouanne are probably prolonged under the south-east of England, and pass along beneath the line of the Thames valley, nearly parallel to the North Downs (chalk range), "and thence under the valley of the Kennett, extending to meet the Bristol coal basin on the west. From Boulogne we lose all traces of the carboniferous rocks until we reach Somersetshire, where an axis of upheaval passes along the Mandip Hills and on to Ireland, in a line with and corresponding to that of the carboniferous strata of France, and known as the Axis of Artois." Should the Bristol basin roll over or be continuous eastward of its present well-defined border, and the views of Mr. Austin and Mr. Prestwich be realized, a great future in coal would be the result. Be this as it may, Mr. Austin has clearly shown, upon theoretical grounds, that the "coal measures of a large portion of England, France, and Belgium were once continuous, our present coal-fields being merely fragments of the great original deposit preserved in depressions or great and irregular hollows." Mr. Prestwich, F.R.S., infers that these underground south-eastern coal basins may have a length of 150 miles from S.E. to N.W., with a breadth of from 2 to 8 miles, and states that the "direction of the great underground coal trough is likely to be a line passing through North Wilts, Oxfordshire, Hertfordshire, South Essex, and the north-east extremity of Kent, and on towards Calne;" or "we may look for the coal basin along a line passing from Radstock through the Vale of Pewsey, and thence along the North Downs to Folkestone and near to Calais.†

It was with the view of arriving at some better evidence relative to the deeply-seated physical or geological structure of the south-east of England that the sub-Wealden boring exploration was undertaken.‡ This was commenced only, and purposely, to solve the problem as to what were the older or palæozoic rocks beneath the so-called Wealden area—whether Devonian or Carboniferous. Already upwards of 1000 feet of secondary strata have been passed through,§ and perhaps another 1000 may still cover the more ancient strata, portions of which are known to occupy the "Boulonnais," on the opposite coast of France. Many years since, deep borings were carried down at Harwich, when slate rocks were touched, but whose age could not satisfactorily be determined; also the deep trial at Kentish Town, when 1120 feet proved a red rock, but like the Harwich, the true age was not determined, although in both cases the cretaceous series were passed through (unless the red rock of Kentish Town was the lower greensand.) At present, therefore, we have been unsuccessful in arriving at any definite knowledge as to the nature of the palæozoic series in the London area, or the *exact* correlation of eastern England with western Belgium, so far as the coal measures are concerned. This may be done or arrived at through the Wealden problem.‖

Many of the physical facts connected with coal and the coal measures, and their original deposition and formation, are of the highest interest, and offer some of the most difficult problems to the geologist for solution or elucidation, and in no country are the physical conditions better understood than our own, owing, doubtless, to the extent of our coal-fields, and the enterprise and science brought to bear upon our resources; and when we realize the fact that most of our coal now lies buried or exists 6000 and 8000 feet below the sea, and that one European coal-field—that of Saarbrücken—occurs over 21,000 feet below this datum (or equal to the height of Chimborazo above it), it opens up a question of the highest cosmical interest. We have still in the valley of the Jordan an extensive area nearly 3000 feet below the level of the Mediterranean and Red Sea—in other words, the surface level of the Dead Sea is 1340 feet below the surface level of the two seas named, and the depth to the bottom of the Dead Sea is about 1370 feet more, thus making the land depression of that area 2710 feet.¶ In connexion with such known modern depressions, we may notice amongst others the following greater ones, all of which have been depressed since, or were gradually so at the time of the growth of the flora or vegetation of the coal-forests, and their conversion or metamorphism into what is now coal. The following five will suffice to show these great depressions, and once coal-plant growing surfaces.

1. The Mons coal basin in Belgium, which is 5330 feet below the level of the sea. 2. That of Liege, nearly 4000 feet. 3. Saarbrück coal-field, in the Rhenish provinces of Prussia, with an area of nearly 900 square miles, is now depressed 21,000 feet below the level of the sea, in the district of Duttweiler near Bettingen.** The fossil remains of these measures being terrestrial, marine, and fresh water, showing repeated oscillation of level during accumulation. This depth below the sea is equal to that of Chimborazo and the Himalaya above it; and according to calculation, the temperature at such depth may be as high as 467° Fahr. 4. The Bristol coal basin, the southern part of which lies in a depression from 6000 feet to 8000 feet below the surrounding sea level, the outcrop edges of the lower series only being at present worked. The deeper part of the basin will probably never be touched. 5. The great South Wales coal basin, the deepest portion of which is about 6000 feet below the level of the Bristol Channel. "We have, therefore, from the highest summits of the Andes or Himalayas, to the lowest parts of known coal basins, or fields, or areas containing coal in Europe, and Britain, a vertical distance of 48,000 feet, or $\frac{1}{33}$ of the earth's semidiameter." Well may we state, then, that this great and "economical" formation demands or invites the attentive study of those whose commercial prosperity is connected with the present supply and use of coal, and the future condition of this country and the people, based upon the supply and demand.

Our Coal-Fields.

I have stated that in Great Britain and Ireland, we have 21 areas, or tracts, or chief districts, where the coal measures are exposed at the surface. The 38 coal-fields comprised within these tracts—viz., 16 in England, 16 in Scotland, and 6 in Ireland—being minor divisions, having in many instances physical demarcations or boundaries to define them. These doubtless once formed one great, and more or less continuous continental or land surface, when Britain was united to, or formed an integral portion of, the now-called continent of Europe. I propose drawing your attention to some of the main features connected with those coal-fields that most concern you as regards the coals they contain, and which are considered the most important. Regarding area, thickness of coal, accessibility, and depth, as important elements to the economical value and working of coal. We may select for England and Wales the following eight coal-fields:—The Great South Wales, the Gloucester and Somerset (or Bristol coal-field), the South Staffordshire coal-field, the North Staffordshire coal-field, the North Wales (Flint and Denbigh), the Lancashire (North and South), the Great Midland (Yorkshire, Derby, and Nottingham), and the Northumberland and Durham.*

South Wales Coal-Field.

Next to the Clyde area, this is the largest coal-field in Great Britain, occupying, as it does, the greater part of the four counties of Monmouth, Glamorgan, Carmarthen, and Pembroke, and ranging from Pontypool on the east to St. Bride's Bay on the west. This great coal tract occupies about 900 square miles, and has a vertical thickness of strata associated with the coal measures of nearly 10,000 feet.† Originally, or at the time of the deposition of the coal and coal measures of this area (South Wales, Devon, Gloucester, and Somerset), the land was periodically depressed, intermittently so, yet continuous, and it may be that the number of coal-seams, great or small, are indices of pauses or epochs of greater stability, clear evidences of a land surface of little elevation above the sea, and on which the coal accumulated through the carbonization of the flora or vegetation. Depression must have gone on during the whole of the carboniferous epoch, until nearly 10,000 feet of strata (sandstones and shales) were spread over what is now the great western coal tract, embracing the fields of Wales, Dean Forest, the Bristol, or Gloucester and Somerset field, North Devon, South of Ireland, and an area now lost under the St. George's Channel. This great region was gradually depressed 10,000 feet during the coal epoch, and has since been slowly elevated again, denudation having removed half the originally accumulated coal measures, and older rocks surrounding the basin. Carmarthen Bay divides the field into two portions, that to the east, as far as Pontypool, being about 56 miles, and to St. Bride's Bay, to the west, 17 miles in extent. The greatest transverse diameter is 16 miles, about the meridian of Neath. Swansea Bay also deeply indents the southern portion of the field, and, doubtless, with Carmarthen Bay, covers up or overlies a vast mass of coal measures. A great and well-marked anticlinal axis traverses the coal-field east of Carmarthen Bay; thus the coals occupying the centre of the field are brought much nearer to the surface along this line, especially so from Risca by Pontypridd, and on to Swansea Bay. The coals thus lie in a north and south trough, or two parallel basins, the northern portion occupying nearly double the area of the south. It is questionable if any of the "minerals" occupying the centre of the basin would or could ever have been worked but for this longitudinal elevation, which brings these lower coals within reach, which would otherwise have been worked only along the north and south outcrops.

The character of the coals undergo a remarkable change, chemically and physically, from east to west. The coals occupying the north-east side of the basin are mainly coking or partially bituminous; those to the north-west are anthracitic. Those on the south side of the basin bituminous or gaseous. The coals in the centre of the basin are semi-bituminous or steam coals. In the Aberdare area the seams are very free burning, but, at the same time, smokeless; hence their importance for steam purposes, especially the Aberdare 4-feet steam coal, which is now nearly exhausted.

Twenty-five seams of coal are known, which exceed 2 feet in thickness, and nearly a total of 100 feet of coal. "The depth to the lowest *important seam*, called the black vein, is 650 yards, or 2100 feet; and the lowest workable coal is reached at 2250 feet in the valleys" (Smyth).

The chief house coal seam in Monmouthshire, and also the uppermost notable seam, is the Mynydd-Isslwyn, 5 feet 6 inches thick. This seam determines the position of the "Pennant," an important arenaceous rock of great thickness (2700 feet) and economic value, both in the Welsh, Forest of Dean, and Bristol coal-fields. The coal measures of this great basin, with its associated shales—ironstones, sandstones, and the 25 coal seams of more than 2 feet thick—measure, according to E. Hull, Esq., F.R.S., 11,650 feet. The same author has estimated the resources of this important coal basin. The commissioners, in their report, estimated that the total quantity of coal‡ available down to 4000 feet§ was 32,456 millions of tons. Mr. Hull has eliminated 673 million tons from this amount, for what he believes over estimation for thin seams. The quantity of available coal under 4000 feet, after proper deductions, is estimated also at nearly 32,000 millions of tons; this may never be realized. In the year 1870 the production from this coal-field alone was 13,664,112 tons; we may, therefore, assume that coal enough exists within the field to last us 2300 years. The occurrence and magnitude of the anthracite coals in the west and north-western portions of the field have much occupied the attention of physicists, chiefly so as to the cause of the extreme carbonization and metamorphism from bituminous, to that of anthracite coal. The area occupied by anthracite coal overlies igneous rocks, both eruptive and contemporaneous, which, through high internal temperatures, may have caused those changes in the nature of the coal during or after carbonization, or an equally high temperature may have been induced by extreme pressure due from the vast mass of once overlying strata, for some of the lower seams must have been covered to the depth of 10,000 or 12,000 feet (*since removed by denudation*). The temperature, therefore, must have exceeded that of boiling water, thus slowly liberating the gases, and converting the bituminous matter into pure carbon (or nearly so) in the form of "anthracitic" or stone coal, the result being due to heat produced by pressure, added to internal heat. Certain it is that only the lowest seams of coal and those existing over a definite area are thus highly carbonized, or converted into non-bituminous or anthracite coal.

It is clear that these anthracitiferous coals were not an original variety, but a modification of the same beds which remain bituminous in other parts of the area or region in which they occur. In other words, anthracite coal is not a separate deposit in another estuary, land surface, or area. Neither is it an interpolation among other bituminous coals, but the bituminous beds altered into a natural coke, from which the volatile bituminous matter (oils, gases, &c.) have been driven off by heat, however produced.

The geographical distribution of these non-bituminous smokeless coals is worthy of attention, and has not been sufficiently studied. They are extremely

* Mr. Etheridge described and explained at some length the general structure of England, having reference to her coal-fields. This was done by the aid of maps prepared for the purpose, and Greenough's fine map of England, and the Coal Commission map of the British Islands.

† A large map was shown illustrating these views, and the relation of England to the Continent as regards the coal deposits and coal-fields.

‡ The bore-hole is at Netherfield, near Battle.

§ The Lower Purbecks, probably the Portland beds, in the form of gypsum, and the Kimmeridge and Oxford clay, which latter strata the bore-hole has proved.

‖ Sections were exhibited showing strata passed though, both horizontal and vertical.

¶ Diagrams were exhibited showing the Dead Sea and Jordan Valley to illustrate this and the probable cause of the super-saturation of the Dead Sea, &c.

** See Hull on the "Coal-Fields of Great Britain," &c., &c., 1873.

* Diagram sections of each of the above were exhibited.

† This great thickness is only surpassed in depth by that of Nova Scotia and Saarbrück, in Rhenish Prussia. Sir W. Logan and Sir H. de la Beche give nearly 12,000 feet of coal measures, from the top of the carboniferous limestone to the highest of the Llanelly series.

‡ After deducting for waste, working faults, bad coal, &c.

§ The limit allowed for future working, or estimated for.

local, yet widely separated. I doubt not the physical and chemical conditions producing them were much the same everywhere. They occur extensively in the west and north-west part of South Wales; sparingly at Walsall and at Kilkenny, in Ireland; and at Bideford, North Devon, but impure, in the form of culm; as blind coal in Scotland; in France, at Allier, Tantal, and Brassac; Mons, in Belgium; Westphalia, Saxony, and Prussian Saxony. America may be said to be the great storehouse for anthracite coal, where it is truly inexhaustible, and is applied to all the demands of art, science, and domestic use. Pennsylvania, Massachusetts, &c., abound in this variety of fuel.* In 1820 only about 500 tons of this coal was used; now, 10 million tons are consumed.†

Gloucester and Somerset, or Bristol Coal-Field.

One of the most interesting and important of the western coal areas, once a portion of, or was united to, the great South Wales and Forest of Dean basins, subsequently divided or separated by extensive vertical movements or folds of the surrounding strata of carboniferous limestone, old red sandstone, and upper silurian, which have since been planed away and removed by denudation, thus exposing the three fields as isolated masses or areas, otherwise closely allied physically. The extreme length, from its northern apex at Cromhall to the northern flanks of the Mendip Hills, is about 25 miles, separated in the middle, near Kingswood, into two basins by an extensive roll or anticlinal axis, by which the lower coals of the centre of the basin are thus brought sufficiently near to the surface to be extensively worked, which otherwise could never have been utilized.‡

Nearly one-fourth of the northern, or Coal-pit Heath and Parkfield area, is overlaid by the nearly horizontal strata of new red sandstone and lias, and nearly nine-tenths of the southern portion of the coal-field, from Bristol to the Mendips, is covered in the same manner by 250 feet of Trias, Lias, and Oolite, many of the shafts penetrating the coal measures through this overlie. The thickness of the *coal measures* in the southern area is not less than 5000 feet, containing 51 seams, and about 100 feet of coal, only 20 seams out of the 51 are upwards of 2 feet in thickness, or in reality about 70 feet of workable coal. This basin is separable into an upper, middle, and lower series of strata or measures—the upper series, 1800 feet thick, containing 10 seams of coal, and about 18 feet of fuel; the middle, or Pennant grits, 1500 feet thick, with 5 seams of coal, and 10 feet of fuel (little worked); and the lower shales, 1600 feet thick, with 36 seams of coal and 70 feet of fuel. The whole of the coals are bituminous, though steam coal occurs in the lower series at Kingswood. No anthracite or cannel coal is known over any portion of the area. Gas coal of good quality occurs in the northern portion of the basin at Coal-pit Heath and Parkfield, the latter being extensively worked for this purpose.§ A remarkable feature in the physical structure of this coal-field is the great central band of rock called the "Pennant," upwards of 1500 feet in thickness, which divides the lower coal-bearing measures from the upper series; it is a constant feature throughout the basin. No shafts have ever penetrated (and perhaps years may elapse ere such will be attempted) the lower coal measures, through the Pennant, its thickness and water-bearing character forbidding such attempt. Economically this Pennant rock is of great value when exposed at the surface.‖ The upper coal series of Radstock and Farrington Gurney contain the finest bituminous coals, *but are extremely thin*. The Radstock beds, containing six seams, unitedly, do not possess 12 feet of coal. The Farrington beds, 600 feet lower, containing four seams about 10 feet, little or no waste occurs, the coals being good throughout. It may be truly stated that nowhere else in Britain are such thin seams worked, or to better profit.¶

The succession in the southern basin or area is as follows:—

Upper { 1st series, Radstock—6 seams, 11 to 12 ft. of coal, 1200 feet of strata.
2nd series, Farrington**—4 seams, 6 to 12 ft. of coal, 800 ft. of strata.

Middle—Pennant grit, 1500 feet.

Lower { 3rd series, Bedminster beds } 20 to 36 seams and 60 feet of coal.
4th or lowest, Vobster „ } 1600 feet of strata.

Millstone grit—No coals, 1000 feet of strata.

The lower series of coals are worked only along or around the outcrop or edges of the coal basin, as at Yate and Kingswood, in the northern area, and Bedminster, Twerton, Mells, Vobster, Ashton, &c., in the southern; extreme depth (5000 feet) and the "Pennant rock" forbidding any attempt to win coals in the centre of the southern area. The Bristol coal-field, although not the most easterly in England, appears nevertheless to be most nearly related to, if not connected with, the western portion of Europe through the coal-fields of Belgium (Mons, Valenciennes, &c.).

The line of connexion or axis may be through or along the Mendip Hills, eastward to Belgium (axis of Artois). It is also believed by some that eastward of the Bristol coal-field another coal tract may occur under the south-eastern counties of England (Kent and Sussex), having direct connexion with the Belgian deposits. This question has been well and ably discussed by R. A. Godwin Austen, Esq., F.R.S., and formed an important item of inquiry by the Royal Commissions. The resources of the Bristol coal-field are extensive, but large deductions must be made for the disturbed and folded strata on the south side of the basin, also for the great depth at which coals lie buried, and also for the thinness of many of the seams, which renders them unavailable at great depths.

Looking at its future, based upon the present yield or output, there is nearly coal enough to last 2000 years. It must be borne in mind, however, that the resources are little drawn upon, considering its capabilities, and the coal-field is capable of yielding five times the quantity now withdrawn from its great store. The original quantity of coal, according to Professor E. Hull, F.R.S., after the necessary corrections for denudation, is estimated at 4148 millions of tons. Deducting from this one-third for inaccessible and spoiled coals, and one-tenth for worked out, with the usual restriction as to depth (4000 feet), Mr. Hull is of opinion that we have stored away for future use in this coal-field 2000 million tons of available fuel. The present output is only 1,000,000 tons, the produce of 34 collieries. J. Prestwich, Esq., F.R.S., in his report upon this coal-field for the Royal Commission estimates the available quantity considerably higher than Professor Hull. The following is his estimate:—

1.	The quantity of coal at a less depth than 1500 ft. .	1,718,791,280	tons.
2.	„ „ between 1500 ft. and 3000 ft. .	1,519,997,981	„
3.	„ „ „ 3000 ft. and 6000 ft. .	2,227,531,577	„
4.	„ „ „ 6000 ft. and 8000 ft. .	637,990,144	„
		6,104,310,982	tons.

From this we must deduct about 2,000 million tons for the quantity below 4000 feet (the limit of calculation), this correction leaving more than 400 million tons for future use. The report prepared by Mr. Prestwich, F.R.S., on this coal-field, aided by the careful work of Mr. Austin, C.E., was one of the most elaborate prepared for, and brought before the commission. Much coal is concealed beneath the estuary of the Severn, between Chepstow and Portishead, thus still more tending to show the original connexion of the South Wales and Bristol coal-fields. Space will not allow me to enter into further details relative to the structure of this complicated, rich, and interesting coal-area.

South Staffordshire Coal-Field.

One of the most important coal-fields of central England, and differs from all others in the character of the subjacent or underlying limestone, which is upper silurian (Wenlock limestone and shales), no Millstone grit or Carboniferous limestone, on which the coal usually rests in other fields, being present. In other words, the old land surface on which the flora grew was an eroded surface of upper silurian rocks. The late Professor Jukes, in his able memoir upon the "South Staffordshire Coal-Field," has clearly shown that, whilst the same accumulations were going on in other parts of England, a broad tract of land, spreading from what is now Shropshire, and across Staffordshire and Warwickshire, was dry land. Consequently, the usually associated or normal conditions of other coal-fields is here wanting; "both the grits and limestones of the carboniferous series being absent, the well-marked isolated silurian masses of Dudley, Sedgley, and Walsall rising from beneath the coal measures, and on which they rest." This coal-field embraces the districts of Cannock Chase, Bilston, and Dudley, a range of country 20 miles north and south from the Clent Hills to Rugeley, and a breadth of about 7 miles. The Bunter sandstone and Pennian rocks which surround or border the coal-field are very thick, the former being 1200 feet and the latter about 2000 feet. The coal measures, divisible into upper and middle, are nearly 2000 feet thick, all the coals occurring in the latter series, the upper group being barren.

The middle group, however, contains six seams of coal, having the united thickness of 65 feet, one of which is the celebrated main, thick coal, or 10-yard, or 30-feet seam. This great accumulation, is composed of eight or ten distinct beds, closely superposed one upon the other, and splits up into nine distinct seams at the northern part of the coal basin near Essington and Pelsall. These nine seams, although really the great 10-yard, divided and separated by 420 feet of sandstones and shales (combined), still equal in thickness the 30-feet coal—in other words, it is one seam of coal measuring 30 feet thick at and near Dudley, but to the north it becomes or is divided into nine "separated representatives," each having its own land surface, underclays, roof, and fossil contents. The presence of this great bituminous mass in the southern part of the coal-field is, to use the words of Professor Warrington Smyth, "*a feature of importance without a parallel;*" it is being rapidly exhausted, and ere long will only "be matter of history." One of the peculiarities of this coal-field are the contemporaneous and eruptive igneous rocks, and the prevalence of intrusive dykes and great lava flows during the accumulation of the coal measures, as exampled by the basalt of Rowley Regis, or Rowley Rag, where the basalt assumes the prismatic and columnar structure. The coal underlies this great contemporaneous lava flow, which "*forms a hill two miles in length and 820 feet in height,*" and has charred and burnt the coal in places so as to render it worthless. Another chief feature associated with the coal are the beds of argillaceous iron ore, of which no less than eight occur, interstratified with the brooch, heather, thick new mine, and bottom coals. The resources of this coal-field are greatly exhausted, or have been greatly drawn upon. The quantity of coal now remaining in the northern and southern portions of the coal-field is 973 millions of tons. In 1870, 9,346,000 tons were raised from 326 collieries. At this rate of consumption, in 103 years this coal-field will be exhausted. No less than 850,000 tons of iron ore were raised in 1870, averaging 33 per cent. of pig iron. In the same year 114 furnaces were in blast, turning out 580,000 tons of pig iron. Mr. W. Mathews has estimated that at the present rate of consumption the 10-yard or thick coal, near Dudley, will only last 40 years. Most of the organic remains are marine, especially the fish, brachiopods, and lamellibranchiata, and they occur abundantly in the shales and ironstones of the "pennystone."

North Staffordshire Coal-Field.

This triangularly-shaped coal basin is of high importance economically, containing 38 seams of coal, and its resources far greater than the South Staffordshire area; twice the thickness of workable coal occurs, and many of the seams are roofed by beds of valuable argillaceous iron ores. The coal measures are divided into upper, middle, and lower. The upper is barren of profitable coal. The middle, or pottery coal and ironstone measures, about 4000 feet thick, contain about 40 seams of coal, associated with ores of iron. The lower group comprise black shales and flags, with the furnace coals, 17 or 18 seams in number, over two feet in thickness. The total thickness of coal in one area is 140 feet. In another, where 24 seams occur, 109 feet, interstratified with courses of carbonaceous ironstone or black band from 2 feet to 6 feet thick, crowded with the characteristic shells, anthracosia and anthracomya. Time will not allow me to enter into the physical structure of this coal-field, where the folds, faults, and anticlinal and synclinal axes so much influence the wealth of the area. From the northern part of this rich field at Rugged Mow-cop Hill, near Congleton, sixteen areas, fields, or coal basins, more or less separated, can be distinguished. Geologically, they had common origin, being portions of one vast deposit, which in time has been modified by depression, elevation, and denudation, or depressed and covered by newer strata, at one period of its history, then upraised and denuded synchronously at another; so that "whilst the higher portions may have stood 8000 feet above the crests of the Peak of Derbyshire, the lower beds may dip down from the Buxton moorlands to the depth of 12,000 feet beneath the plains of Cheshire."* This mode of reading the old physical geography of our coal-fields, and their original geological structure, has been one chief feature and object of the Royal Commission, so that by the inductions of physics and geology, we may solve one of those great questions of national moment and importance, by endeavouring to trace the continuity or connexion between, and position of, deep-seated coal-fields yet unknown, or at least try to unite these apparently disunited areas now covered by overlying or newer strata which conceal the irregularities of the old coal-bearing land surfaces below.

The resources of this richly stored coal-field are very great; it has 30 seams of coal of the united thickness of 150 feet, and an available quantity of coal amounting to 3720 millions of tons. In 1870, 108 collieries produced nearly 4 millions of tons of fuel, 1,720,500 tons of which were consumed and used in the production and manufacture of iron. In the same year, 37 blast furnaces produced 303,378 tons of pig iron from 910,134 tons of ore. At the present rate or yield, the coal of this remarkable field will last nearly 1000 years.†

Many of the beds throughout the field abound in organic remains, no less than 50 species of fish having been recognized by Mr. Ward, of Longton. The mollusca, like the fish, are of marine origin, thus clearly showing, with the associated plants of the coal, that the whole was accumulated under estuarine conditions.

(*To be continued.*)

* The coal areas of America equal 163,000 square miles, or 33 times our quantity, and nearly untouched.

† The lower coal measures are the chief repositories of the ironstones of the basin (Merthyr Tydvil on the north, Taff Vale on the south). The beds are about 5 inches thick—metallic iron, 40 per cent.; containing marine shells, fish, and plants.

‡ Sections and coloured diagrams of this coal-field were exhibited, showing the physical conditions from N. to S. and E. to W.

§ These are the lowest coals in the *upper series*, and are immediately above the "*Pennant*," which divides the lower from the upper coal measures over both areas of the coal basin.

‖ This Pennant rock occupies the same geological position in South Wales, there determined by the position of the Mynydd-Isalwyn coal seam and the Hughes vein.

¶ Some little more than one foot in thickness.

** These seams are worked at Parkfield or at Kingswood, in the northern basin. At Parkfield they are fine gas coals. The first, or Radstock series, do not occur at Coal-pit Heath or Parkfield.

* "Coal and Coal Mining," by Professor W. W. Smyth, F.R.S., p. 54.

† Mineral Statistics, 1870, and Professor Hull's "Coal-Fields," p. 179.

IRON AND COAL TRADES OF SHEFFIELD, SOUTH YORKSHIRE, AND NORTH DERBYSHIRE.

(FROM OUR OWN CORRESPONDENT.)

There is not much change to report this week—that is to say, no great or sudden movement of the market in either a forward or retrogressive direction, although the undoubted improvement in trade still continues, particularly in the heavy departments. The founders are still in the receipt of a very encouraging number of orders, many of them being of very respectable proportions. The bulk of the work so contracted for is, as a matter of course, large machine and colliery castings for the considerable number of new pits which are being opened up in the Midland coal-field. There is, nevertheless, a good business doing in pipes, hydrants, cocks, valves, and other miscellaneous water and gas-work requirements. Much of the total output of these goods is being produced in East Derbyshire on account of the Sheffield companies, whose requirements have of late been very extensive and continuous. Agents of the Cleveland and North Yorkshire firms hold pig iron pretty firmly; but it is anticipated that the settlement of the Durham miners wages difficulty will herald a fall of some shillings per ton. Current official quotations are now, No. 1 foundry, 74s.; No. 2 foundry, 72s. 6d.; No. 3 foundry, 67s. to 68s.; No. 4 forge, grey, 59s.; No. 5 forge, mottled, 57s.; No. 6 forge, white, 56s. Refined metal, 80s.; Kentledge, 70s.; and cinder pig, 50s. per ton for net cash, at the works, or in waggons. The blast-furnaces in this locality are fairly active, particularly at Sheepbridge, Staveley, and Sheffield. It is understood that the shipment of Spanish iron ores is being resumed from Bilbao, several leading Sheffield capitalists being now in that country. A good deal of ironstone and ore is also being used here from Northamptonshire and North Lincolnshire.

The Rotherham brass-works are still very busily engaged on every description of plumbers and engineers brass-work, in addition to a growing demand for water-works fittings and contrivances, such as meters, ball-cocks, taps, valves, hydrants, and the like.

The coal trade of South Yorkshire and North-east Derbyshire is tolerably busy in satisfying a not very exigent demand for export and the London market. It should, however, be understood that some firms are doing a strong business for London, mostly on merchants speculative winter purchases, and that they have put up prices 1s. per ton for hard coal. Soft coal has been dearer in the London market, but I do not hear of its price having been augmented in this neighbourhood. The coal traffic conveyed from the South Yorkshire and Derbyshire coal-field during August was of much less tonnage than during August, 1873. The six leading Silkstone pits only sent 7900 tons this year, and the twelve principal collieries working the Barnsley thick coal 6750 tons, being a falling off of 50 per cent. in both instances. The Derbyshire tonnage wasalso smaller.

IRON AND COAL TRADES OF SOUTH STAFFORDSHIRE AND EAST WORCESTERSHIRE.

(FROM OUR OWN CORRESPONDENT.)

Increased activity is the characteristic feature of the iron trade. There is a good demand for nearly all classes of finished iron, and the merchants are in most cases pressing for immediate delivery. The augmented requirements of the shipping trade, in anticipation of the closing of the northern ports, is perhaps the chief reason of the comparatively sudden change from depression to buoyancy which is just now experienced. The demand on account of the Russian market is exceptionally good, and as the Baltic will be closed for the season in the course of a few weeks, manufacturers are taxed to the utmost of their power to complete the orders they have already accepted. Merchants have in many cases been forced into the market, their requirements not permitting any further postponement, though, could they have withheld their orders a few weeks longer, there is little doubt they would have been able to place them with greater advantage to themselves, as everything points to cheaper iron so soon as this temporary spurt is over. It is now considered probable that the ironworkers wages will be reduced at the end of the current month. The principal demand is for hoops and sheets, though bars are in fair request; £12 is still the standard price for marked bars, and the leading houses are doing a fair business on that basis. Commoner qualities may be had at £10; but makers decline to accept a lower figure. Notwithstanding the recent reduction in fuel, sheets are firm at £13 5s., and there is no prospect of easier quotations for a week or two; indeed, some makers affirm that the existing quotations will be maintained on quarter-day; but buyers seem determined to bring down prices £1 per ton at least. Few complaints are now heard as to foreign competition, though it was reported on 'Change last week that a Belgian firm had taken an order for 2000 tons of iron for Rotterdam, which, according to precedent, should have found its way into South Staffordshire. The demand for pig iron is fairly active in sympathy with the improved aspect of the merchant iron trade, and makers report that they can obtain a ready market for their produce, and that the competition of other districts is considerably abated. Much confidence is now felt in the policy adopted a few weeks ago of "blowing in" furnaces, in anticipation of an early revival of business. At a meeting of the trade, held on Wednesday last, it was resolved to give the customary notice for a reduction of 10 per cent. on the wages of blast-furnace men,

The timely relief afforded in the price of fuel has already had a beneficial influence on the local hardware trades, and where prices have been lowered to a moderate standard, orders are coming in more freely. Nuts, bolts, and rivets have been reduced £1 per ton, and wrought tubes and fittings are offering at 10 to 15 per cent. lower than the quotations ruling at the commencement of the quarter.

The coal trade shows symptoms of revival, and there seems no probability of any further reduction before January next.

Colliers wages will be reduced 6d. per day, and their mine workmen 3d. per day, from October 1st next; this is in accordance with the agreement entered into by the coalmasters and the colliers delegates at a meeting held in Birmingham in July last, under the presidency of the mayor (Mr. Chamberlain), which provides that colliers wages shall in future be regulated by the selling price of coal, and it is generally expected that the men will now offer no resistance to the terms submitted. Large stocks of coal are still held at many of the collieries; but it is probable that consumers will now purchase their winter's requirements, and thus relieve the coalmasters of their surplus supplies of fuel. The demand for coke, though much improved, is far from active.

THE COAL AND IRON TRADES OF LANCASHIRE.

(FROM OUR OWN CORRESPONDENT.)

For the better classes of coal there is still a good demand in this district, and prices are firm. In house coal some of the leading coal-owning concerns in the Manchester district are very busy, and are now getting behindhand with their orders, whilst stocks have been considerably reduced. In the inferior descriptions of fuel, however, trade is quiet, and the closing of the cotton-mills in the Bolton district during the past week has thrown a considerable quantity of engine fuel back upon the market, and prices have had rather an easier tendency. As, however, the mills are now resuming work, the demand from this quarter has only received a temporary check, and good qualities of burgy and slack are steady in price. The average pit quotations in the Manchester district range about as under:—House coal, 12s. to 15s. per ton; furnace coal, 10s. 6d. to 11s. 6d.; burgy, 7s. 6d. to 8s. 4d.; and slack, 5s. 6d. to 6s. 3d. per ton. The output from the pits is more regular now that the disturbing elements in the shape of local wakes and races are almost at an end, and the men are working with tolerable steadiness.

The increased demand for gas coal continues, and the prospect of a strike in the Wigan district is bringing a large number of engineers into the market.

Consumers who have not yet made their contracts are now exhibiting an anxiety to secure supplies. Prices are stiffer, and it is difficult to place orders on terms which would have been readily accepted a month or so back. The average quotations for best screened gas coal at the pit's mouth range from 14s. to 15s. per ton, and ordinary from 12s. to 14s. per ton.

A steadier tone is also perceptible in the coke trade, and prices are well maintained.

In the Wigan, St. Helen's, and other West Lancashire districts, trade continues disorganized, in consequence of the unsettled state of the labour market. Although the probability of the closing of the pits is causing more orders to come into the market, and colliery proprietors are at present less inclined to enter into contracts, the ordinary trade is quiet, and pit quotations run about as under:—Arley Mine coal, 14s.; house coal, 10s. to 11s. and 13s.; steam fuel, about 10s.; burgy, 7s. 6d. to 8s.; and slack, 5s. to 6s. 6d. per ton.

The wages question in West Lancashire shows no signs of an amicable settlement. The masters are firm in insisting upon the full 15 per cent. reduction, without any reference to arbitration, and the prevailing belief is that a strike is inevitable.

In the iron trade there has not been quite so much business doing as during the previous two or three weeks. In forge iron, some considerable sales are still being made; but founders appear to have stopped buying, except for immediate wants, and the orders given out are for very small parcels. No. 3 foundry pig iron, delivered in the Manchester district, is quoted at from 77s. 6d. to 78s. per ton for early delivery, but for delivery over the year 75s. would be accepted; forge numbers range from 67s to 70s. per ton. In manufactured iron there is not much change to notice, and prices are practically the same as those last quoted, ordinary bars ranging from £9 12s. 6d. to £9 15s. per ton delivered, with other descriptions in proportion. There is a push just now for deliveries, in consequence of the approaching close of the shipping season; but when the pressure for shipments is over, there is an opinion in some quarters that lower prices will be seen.

COAL AND GENERAL TRADE OF THE NORTH.

(FROM OUR OWN CORRESPONDENT.)

As was anticipated, the extra demand which had sprung up for gas and other coals in the Durham district has proved to have been entirely owing to the fear of a strike amongst the pitmen, for as soon as the coalowners and the men came to a mutual agreement to refer the points in dispute to Mr. Geo. Leeman and Mr. D. Dale, acting on behalf of the masters, and Mr. Thomas Burt, M.P., and Mr. Lloyd Jones, on behalf of the men, and who were to be arbitrators, the market fell completely flat again, and prices were upon the whole weaker than they were before the disturbance took place. There was a considerable falling off in coasting business, and small coasting vessels were not in request. The steam coal trade was likewise dull, and quoted prices could not be sustained. Somehow or other, with the exception of two or three collieries which have long contracts, the other pits in the steam coal trade have to make an abatement of 1s. or 2s. per ton before much business can be transacted. There is no improvement in the manufacturing coal trade. In fact there has been no life in it for the past two months. Nearly all the foreign stations using steam coal seem to be overstocked, and steamers have to take very low freights for carrying the few cargoes that are brought in the market for the Mediterranean.

In the North of England iron trade business has been quiet during the past ten days. The price of foundry iron has declined; but forge iron has been firm. In the finished iron trade business has been somewhat better. But there is no great force in the Cleveland iron trade generally, which drags itself along week after week in singular contrast to the animation which prevailed in it 18 months ago.

There is a considerable demand at present for all classes of fire-clay goods, and shipments of bricks and retorts are very active. The general manufacturing trades of the North of England are very well employed, and the chemical business is firmer in tone. The strikes which prevailed in the chemical business of the Tyne during the past fortnight have been arranged, and the men are all at work again.

GAS EXPLOSION AT LEICESTER.—On Friday morning, Sept. 11, a serious explosion of gas occured about eight o'clock on the premises of Messrs. J. T. Gent and Co., electricians, Friar Lane, in this town, by which two workmen were most seriously injured, three others effecting a most miraculous escape. It appears that one of the workmen, wishing to boil some water for breakfast by means of a small gas-stove, to save time connected the pipes so as to allow the gas to pass through a glass bottle used in purifying oxygen gas. No sooner, however, had the tap been turned on and a light applied than the purifier burst with a terrific noise and force. The glass flew about in every direction. Three pieces struck the workman in the face, and other pieces penetrated his neck, severing three veins, which were in close proximity to the jugular vein. A youth who was standing near at work had his bare arms fearfully cut. Several other workmen engaged at the same bench miraculously escaped. Ten of the panes of glass in the windows were shattered, and so intense was the force of the explosion that fragments of glass were driven into the opposite wall, and halfway through a shelf in the room. The sufferers were conveyed to the Infirmary. The wounds received by the youth having been dressed, he was allowed to return home. The case of the man was of a more serious character; so much so that it was at first feared a fatal termination might ensue. However, by skilful treatment, he is now progressing favourably.

MALAM'S SYSTEM OF GAS-MAKING.—An occasional correspondent writes us as follows:—"Within the last few days an official visit has been paid to Dumfries Gas-Works by Messrs. G. C. Trewby and H. Brothers, of the London works at Beckton and Kensal Green, for the purpose of making a careful examination of the system of carbonizing, devised and patented by Mr. Abraham Malam, of that town, and of the quantity and illuminating power of the gas produced by it. Mr. Trewby was two days at the works, and superintended the general working, and especially the carbonizing of one ton of cannel coal from Longlee Colliery, Lesmahagow, Lanarkshire, and both he and Mr. Brothers afterwards examined the gas photometrically. They were both highly pleased with the results, and it is believed that a very favourable report will be submitted by the two gentlemen named to the directors of the Chartered Gas Company. The same subject has also lately been under the consideration of the Glasgow Corporation Gas Commissioners; and it has been fully resolved to send a deputation to Dumfries to examine the process and the resulting gas, and to report. There is every probability that the deputation will include Mr. William Foulis, the engineer-in-chief to the Glasgow Gas-Works, and Dr. Wallace, F.R.S.E., the gas examiner to the city of Glasgow. With reference to a paragraph which appeared in your columns last week, regarding the decision of the Dundee Corporation Gas Commissioners on the Malam system of manufacturing gas, it is but proper to state that the report presented to them was based on an impression that was formed on an examination of the gas by using an ordinary jet burner instead of an Argand, seeing that it was Newcastle common coal that was used, and not ordinary Scotch cannel; besides which, the experiments were not of the thorough character which the circumstances of the cases demanded, and were altogether unfair to the process. Indeed, it was distinctly understood that no report should be published until the system had been thoroughly tested, both to the satisfaction of the patentee and the persons engaged in making the examination to which the Dundee report had reference."

GAS EXPLOSION AT SHEFFIELD.—On Friday last a serious gas explosion occurred in this town. The authorities had opened a main sewer in Blonk Street, and it is supposed a gas-pipe had been severed. Mrs. Williams, eating-house keeper, having a shop in Blonk Street, went into her cellar at eleven o'clock with a candle, when an explosion of gas, which had escaped from the pipe, occurred, blowing out some brickwork, and sending a high jet of flame across the pavement. Mrs. Williams was terribly burnt on the hands and body, and was removed to the Victoria Hospital.

GAS-PIPES FATAL TO TREES.—J. Boehm says: "Cuttings of willow, the lower ends of which were placed in flasks containing a little water and filled with coal gas, developed only short roots, and the buds on the upper parts died shortly after unfolding in the air. Of ten plants in pots (varieties of fuchsia and salvia), among the roots of which coal gas was conducted through openings in the bottoms of the pots, seven died in four months. To show that the plants were killed, not by the direct action of the gas, but in consequence of the poisoning of the soil, several experiments were made with earth, through which coal gas had passed for two or three hours daily for two and a half years. The rootlets of seeds sown in this soil remained very short and soon rotted. A plant of dracæna was repotted in the soil; in ten days the leaves dried up and the roots died. The author thinks these results sufficiently account for the fact that trees planted near gas-pipes, in streets, so often die; and recommends the inclosing of gas-pipes in wider tubes, having openings to the air, and through which currents could be maintained by artificial means. Such a plan is still more to be recommended on hygienic grounds, since it has been shown, by Pettenkoffer, that infiltration of coal gas, through the soil, take place even into houses not supplied with gas."—*Scientific American.*

Register of New Patents.

239.—BROADFOOT, J., Glasgow, "*Improvements in pumps.*" Patent dated Jan. 19, 1874.

In carrying out this invention each piston-rod has formed on it or attached to it a crosshead frame made with a rectangular slot. Each crank-bush is made in two halves, which can be put in place and screwed together after the crosshead frame is put over the cranks, and is provided with a circle of anti-friction rollers, which are kept in their proper relative positions by rings at the sides, cut into halves to admit of their being put into their places.

242.—GEDGE, W. E., Wellington Street, Strand, London, "*Improvements in gas-burners with lateral and covered jets.*" A communication. Patent dated Jan. 19, 1874.

This invention consists essentially in the use of a special burner, termed by the inventor "burner with covered jets," by means of which the gas supplied with the quantity of air necessary to perfect combustion is consumed with little or no loss, while producing the maximum of caloric. Further, by the position of the jets, placed horizontally, they cannot easily be stopped up, and in any case may be cleaned in a few moments by removing the upper part of the burner, which is fitted by simple superposition, or more firmly by means of two bayonet joints.

The burner formed of one or of several concentric rings, with one or more feeders placed either horizontally or vertically, is composed of two principal parts, one fixed, namely, the under part; one moveable, namely, the upper part; and the horizontal covered jets may be made either on the lower fixed part, or on the lower part of the upper moveable part. These crenated jets, instead of being made after the manufacture of the burner and by hand, as in the ordinary burners, whether mushroom or ring burners, are made in the casting, the result of which is a considerable reduction in the cost price, and consequently in an equivalent proportion in the selling price. This burner is therefore likely to bring gas into common use for cooking and heating purposes it being applicable to all kinds of apparatus for heating and cooking by gas, kitchen ranges, or manufacturing or chemical apparatus.

246.—VAUGHAN, E. P. H., Chancery Lane, London, "*Improvements in apparatus for generating inflammable gas by the carburization of atmospheric air.*" A communication. Patent dated Jan. 19, 1874.

This invention relates to improvements in the construction of those types of carburetters in which the volute or other mixing and forcing apparatus is mounted on a tubular shaft driven by weights or other motor. The improvements mainly consist in reducing the friction of the shaft and other moving parts by limiting its length to that of the generating chamber, and mounting it on special bearings in connexion with a spring or other motor; and, furthermore, in providing regulating mechanism in combination with the gasometer, by means of which due equilibrium is maintained between the production and consumption of the gas, and the expenditure of driving power.

254.—SYNGE, M. H., Pall Mall, London, "*Improved apparatus for deodorizing and discharging fluids, and for trapping sinks, drain-pipes, and tanks.*" Patent dated Jan. 20, 1874.

This invention relates to a novel appliance for containing charcoal and presenting it in such a manner as to make its filtering and deodorizing qualities applicable to a variety of domestic uses.

255.—SYNGE, M. H., Pall Mall, London, "*Improved apparatus for filtering and purifying the drainage of houses and streets.*" Patent dated Jan. 21, 1874.

This invention consists in rendering the drainage of houses innocuous, for watering roads, cleaning streets, and other kindred uses. For this purpose a given number of houses are grouped together to drain them into a series of filtering-tanks which may be arranged under the footway. Access being given to these tanks by means of manholes.

277.—TYLOR, A., and TYLOR, J. J., Newgate Street, London, "*Improvements in apparatus and arrangements for containing, measuring, controlling, regulating, and arresting the supply of liquids and fluids, and preventing waste.*" Patent dated Jan. 22, 1874.

These improvements consist in—1. Forming service cisterns for water-closets of porcelain, earthenware, stoneware, or other plastic material rendered impervious to water, or forming them of glass, asphalte, bitumen, or waterproof material, combined, when necessary, with fibrous material or materials, or iron or other metal netting, cloth, wire, or other similar combination enclosed in the substance, in order to give strength and maintain form. 2. Arranging the cisterns to prevent waste, and forming them with three or more divisions, partitions, or chambers communicating, and provided with one or more valves controlling them, operated by the actuating part, so as to retain a portion of the water and always give a seal, without rendering it necessary to empty the cistern. 3. Arranging cisterns with an air-tight receptacle provided with an air-valve and an opening in the lower part, which closes the outlet, and rises to let the water pass when the actuating arrangement is operated, and, whilst the water is passing out, allows a portion to enter and cause it to descend and close the outlet on the desired quantity having passed. This portion of water is retained until the actuating part is released, when it flows out and seals the receptacle. 4. Arranging a small meter or meters on a bye-pass or smaller pipe or passage connected with the larger pipe or channel, through which the main body of water flows, so that it shall enable the quantity of water passing through the large pipe to be measured by the quantity passing through the smaller one acting on the meters, and placing a valve or valves between the meters and the water, to act as a regulator and assist in causing the same to register correctly. 5. Arranging submerged self-closing "waste-not" valves for use in cisterns, so as to have a rotary or partially rotary movement, caused by the parts in connexion working in inclined planes or slots formed in the actuating portions, or by causing them to work in such inclined planes or slots attached to or connected with the portion controlling the outlet orifice, and forming on or attaching to the same resisting blades or projections, so that these parts, in conjunction with the height of the lift and amount of incline of the planes or slots, may enable the quantity of water passed to be regulated; and applying guides or slide-bars to confine the action of the parts to an upward and downward movement, in addition to the rotary or partially rotary movement, and thereby ensure the return of the valve or part controlling the outlet orifice to its seat, and also arranging the same so that they cannot be left or kept even partially open. 6. Arranging both valves so that the opening or closing one shall prevent or permit the opening or closing of the other, and, when both are closed, the outlet can be opened. 7. Arranging push-in valves to shut off without shock, so that the part closing the outlet orifice shall shut off the openings by which the water obtains access to the outlet, and arranging them so that they may be readily made.

283.—SCOTT, H. Y. D., Ealing, Middlesex, and SPENCE, J. B., Manchester, "*Improvements in the treatment of sewage and ammoniacal liquids.*" Patent dated Jan 22, 1874.

The object of this invention is the treatment of sewage and ammoniacal liquids, so as to abstract the ammonia present in a cheap, portable, and stable form.

When the liquid to be operated upon is town sewage resulting from the use of "water carriage," and the overflow of cesspools, the suspended matters are removed by the lime process of precipitation. The clarified or limed sewage is then passed through layers composed of natural phosphate of iron, and it is preferred to make use of upward filtration for the purpose, or the sewage water is agitated with so large a quantity of the phosphate of iron salt that the liquid becomes thoroughly well swept by its particles, so that as far as possible the want of fluidity in the precipitant may be supplied. The phosphate salts are then allowed to subside in combination with the ammonia abstracted from the liquid in order that the top water may be drawn off. The same processes are applicable in the case of ammoniacal liquids in general.

APPLICATIONS FOR LETTERS PATENT.

3145.—CLARK, A. M., Chancery Lane, London, "Improvements in lamps." A communication. Sept. 14, 1874.

3152.—POCOCK, A. W., Church Street, Westminster, "Improvements in compensating wet gas-meters." Sept. 15, 1874.

3164.—BARKER, E. D., Bedford Row, London, "Improvements in valves for pumps and other engines." Sept. 16, 1874.

3174.—KIDD, J., Martin's Lane, London, "Improvements in gas-producing furnaces." Sept. 17, 1874.

3178.—NEWTON, W. E., Chancery Lane, London, "Improvements in filters for filtering or purifying water and other liquids." A communication. Sept. 17, 1874.

3182.—FORBES, Rev. G. H., Broughton, Northampton, "Improvements in the manufacture of cements." Sept. 17, 1874.

GRANTS OF PROVISIONAL PROTECTION.

3047.—JOHNSON, J. H., Lincoln's Inn Fields, London, "Improvements in apparatus for compressing gaseous fluids." A communication. Sept. 4, 1874.

3087.—WILKES, J. P., Trinity Square, Great Tower Street, London, and AUNIER, A., Ladbroke Grove Road, Notting Hill, London, "Improvements in the mode of and apparatus for the extraction and treatment of sulphur." Sept. 9, 1874.

3095.—ROWBOTTOM, J., Halifax, Yorks, "Improvements in retorts, and in means or apparatus for charging and discharging the same." Sept. 9, 1874.

3101.—ATKINS, T., St. Albans, Herts, "Improvements in stoppers, valves, and apparatus for filling and discharging bottles, vessels, store-chambers, mains, or other holders used for containing fluids, liquids, gases, or vapours." Sept. 10, 1874.

NOTICES TO PROCEED.

1550.—KNOWLES, Sir F. C., Lovells Hill, Berks, "Improved manufacture of gas for heating purposes." May 2, 1874.

1589.—LENOIR, F., Paris, "An improved apparatus for carburetting gas." May 5, 1874.

1629.—KAULBACH, E., Gower Street, Bedford Square, London, "An improvement in the means of and apparatus for raising and lowering gaseliers and chandeliers, the same being applicable also for other purposes." May 8, 1874.

2920.—RAMSDEN, J. C., Lightcliffe, Halifax, Yorks, "Improvements in apparatus to be employed in the manufacture of gas for heating or illuminating purposes." Aug. 26, 1874.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

933.—LOCKWOOD, W., Sheffield, Yorks, "Improvements in valves for regulating the pressure of steam, air, water, or other fluid." March 21, 1874.

1052.—JENSEN, P., Chancery Lane, London, "Improvements in the manufacture of gas and apparatus therefor." A communication. March 25, 1874.

2017.—HEALE, H. W., Southwark, and GOWAN, E. D., Holloway, London, "Certain improvements in the manufacture and construction of taps or valves." June 10, 1874.

2243.—BISCHOF, G., Glasgow, "Improvements in the construction of filters and in the preparation of materials used for the purification of water." June 29, 1874.

2374.—FORBES, Rev. G. H., Broughton, Northampton, "Improvements in the manufacture of cements." July 7, 1874.

2450.—SCOTT, H. Y. D., Ealing, Middlesex, "Improvements in the recovery of carbonate of ammonia from sewage." July 13, 1874.

2520.—JOHNSON, J. H., Lincoln's Inn Fields, London, "Improvements in the separation of ammonia from illuminating and other gases." A communication. July 18, 1874.

2563.—CLARK, A. M., Chancery Lane, London, "Improvements in steam-pumps." A communication. July 22, 1874.

2618.—GAUKROGER, J., Todmorden, FIELDEN, S., Walsden, and AITCHISON, A., Manchester, "Improved apparatus for generating gas for lighting, heating, and cooking." July 27, 1874.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

2180.—GRABHAM, E. J., "Improvements in the apparatus used for regulating the supply of gas." Aug. 19, 1871.

2194.—BREACH, J. R., "Improved gas-fires." Aug. 21, 1871.

2231.—SMITH, T. J., "An improved process for producing ammonia." Aug. 25, 1871.

2247.—ZENGER, K. W., "A new method of manufacturing gas and graphite from mineral, vegetable, and animal coal, and from tar and other hydrocarbons." Aug. 26, 1871.

2254.—HAZELTINE, G., "An improved method of and apparatus for utilizing the explosive force of gas as a motive power." Aug. 28, 1871.

2263.—WEBB, W., "Improvements in joints or connexions for uniting the ends of soft metal pipes to one another and to other pipes and cocks and union-pieces." Aug. 28, 1871.

2274.—BRIGHT, H., "Improvements in the means and apparatus for drying sewage and other matters, and destroying noxious vapours arising therefrom." Aug. 30, 1871.

2401.—BARLOW, W. H., "Improvements in pumps, water-meters, and engines for obtaining motive power." Sept. 12, 1871.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION has been AWARDED to

GWYNNE & BEALE'S PATENT IMPROVED GAS-EXHAUSTERS,

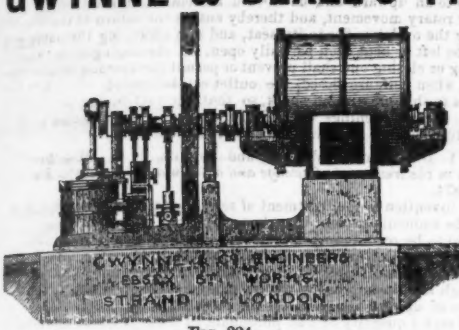


FIG. 224.

The BEST EXHAUSTERS IN THE WORLD.

Made under the personal superintendence of

Mr. BEALE,

The oldest Maker, Inventor and Patentee of

GAS-EXHAUSTING MACHINERY.

(It is NOT CORRECT to state that Mr. BEALE has RETIRED.)

Prices and every information on application.

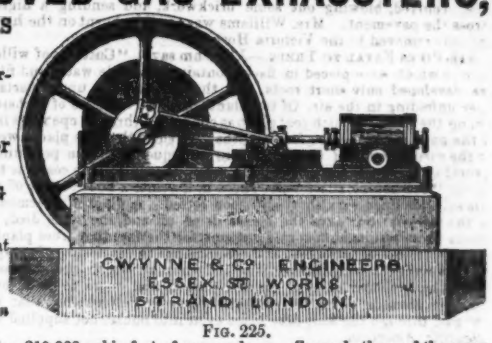


FIG. 225.

Fig. 224 represents one of those erected at the Imperial Gas-Works, Bromley, capable of passing 210,000 cubic feet of gas per hour. Several others of the same size are now on order for the same Company. These Patent Machines combine the highest quality of workmanship and materials, the largest bearings and wearing surfaces, with the most perfect system of action yet discovered. Fig. 225 represents one of a series of four at the Nottingham Gas-Works, each passing 52,500 cubic feet per hour. GWYNNE AND Co. *do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, but to produce Machinery of the very highest quality, and the most approved design and arrangement.* Their prices have been estimated with a due regard to the excellence of the article produced, and when this is taken into consideration, they have no fear for the result. The orders executed this season for Exhausters and alterations to their patented system amount to over 4,000,000 cubic feet of gas passed per hour, and to over 300 horse power for Engines to drive them. In every instance their work is giving the greatest satisfaction. Numerous testimonials and references can be given.

REGULATORS, BYE-PASSES, STOP-VALVES, GAS-VALVES, & MACHINERY FOR GAS MANUFACTURE, OF ALL SIZES, CAN BE HAD ON APPLICATION TO

GWYNNE & CO., HYDRAULIC & GAS ENGINEERS, ESSEX STREET WORKS, STRAND, LONDON, W.C.

G. & Co. are now manufacturing for a London Gas Company three of their 210,000 cubic feet Patent Gas Exhausters, and many of all sizes.

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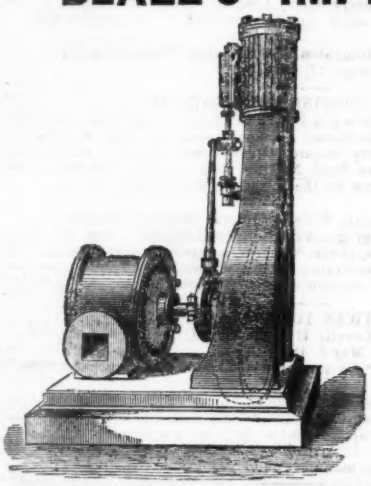
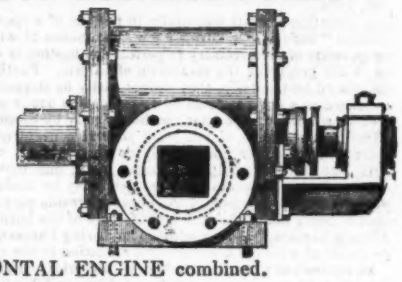


WITH

ENGINE COMBINED

ON

ONE BASE PLATE.



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"This may be fairly described as among the most useful manuals of its class."—*Iron.*

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"The new edition is published in a small octavo form, which makes it a handy book, either for the pocket or the desk."—JOURNAL OF GAS LIGHTING.

"An excellent little book."—*Mr. R. H. Patterson (late Gas Referee) in the* JOURNAL OF GAS LIGHTING, *April* 28, 1874.

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BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 27 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

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WANTED, for a provincial Gas-Work, a good MACHINIST, capable of erecting engines and exhausters, repairing pumps and valves and all gas machinery, and accustomed to the control of workmen.

State salary, and furnish testimonials, to Y., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Advertiser, aged 29, an engagement as ASSISTANT MANAGER or Superintendent of a Gas-Work. Thoroughly understands the manufacture and distribution of gas, having had charge; also designing and erecting works. Fair draughtsman, with a knowledge of accounts, chemistry, photometer, &c. Can produce testimonials or give references.

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A Young Gentleman, aged 27, married, who has had 10 years experience in Gas-Works, desires an engagement as ASSISTANT. Can test meters, examine gas, and superintend the manufacturing department. First-rate references.

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For further particulars, apply to Mr. ALFRED LASS, 60, Cornhill, LONDON, E.C.

TO PIPE-LAYERS.

THE Bracknell Gas Company, Limited, invite TENDERS for providing and laying about 842 yards of 2-in. SOCKET-PIPES, with syphons, branches, &c., complete.

Particulars may be obtained from the undersigned. Tenders to be delivered by the 23rd of September inst.

F. W. HUNTON, Secretary.

Bracknell, Berks, Sept. 3, 1874.

STATION-METER.

THE Directors of the Hampton Court Gas Company have for SALE a good STATION-METER, capable of passing 6000 cubic feet per hour, with 6-in. connexions, including inlet, outlet, and bye-pass valves, all complete and in good working order. Discontinued in consequence of being too small.

Apply to EDWARD PRICE, Engineer, the Works, HAMPTON WICK.

THE Oldham Corporation Gas and Water Works Committee are prepared to receive TENDERS for supplying them with Wet GAS-METERS to the end of June next.

Particulars can be obtained on application to Mr. Herbert Andrew, Gas and Water Offices, Oldham.

Tenders to be sent in on or before Tuesday, Sept. 29.

By order,

H. BOOTH, Town-Clerk.

Oldham, Sept. 17, 1874.

TO GASHOLDER MAKERS.

THE Spalding Improvement Commissioners have determined upon the erection of a new Iron TANK and GASHOLDER, at the Gas-Works in Spalding, and are desirous to receive TENDERS for the execution of the work.

The drawings and specifications can be seen and copied, and further particulars may be obtained, on application to the undersigned, at the Office of the Improvement Commissioners, at No. 1, Herring Lane, Spalding.

Sealed tenders, endorsed "Gas-Works Tender," to be sent to the undersigned on or before Saturday, the 3rd day of October next, but the Commissioners do not pledge themselves to accept the lowest tender.

Security will be required for the due performance of the contract.

F. T. SELBY, Clerk to the Spalding Improvement Commissioners.

1, Herring Lane, Spalding, Sept. 12, 1874.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

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THE GAS-METER COMPANY, LIMITED.

NOTICE is hereby given that the ORDINARY GENERAL MEETING of this Company will be held at the Offices of the Company, 10, Coleman Street, City, London, E.C., on THURSDAY, the 1st of October next, at One o'clock precisely, to receive the Report of the Directors, to declare a Dividend to the 30th of June last, and for the general business of the Company.

By order of the Board,

WILLIAM A. COGAR, Secretary.

10, Coleman Street, City, London, Sept. 17, 1874.

THE LONDON GASLIGHT COMPANY.

NOTICE is hereby given that the ORDINARY HALF-YEARLY MEETING of the Proprietors of the Company will be held at the Freemasons Tavern, Great Queen Street, Lincoln's Inn Fields, on WEDNESDAY, the 14th day of October, 1874, at Twelve o'clock precisely.

The Transfer Books will be closed on Tuesday, the 29th day of September, until after the meeting.

By order of the Board,

Dated Sept. 21, 1874. A. J. DOVE, Secretary.

MEMORANDUM.—Proprietors must hold capital stocks, or shares paid up to the amount of £250, to be qualified to attend the meeting.

DRONFIELD GAS-WORKS.

TO IRONFOUNDERS AND CONTRACTORS.

THE Directors of the Dronfield Gas Company are prepared to receive TENDERS for the supply of a new GASHOLDER, 60 ft. diameter 18 ft. deep, with columns, &c.; four Purifiers, 8 ft. by 8 ft. by 4 ft. deep, with centre-valve and connecting-pipes; a Condenser, with 32 8-in. pipes, and all the necessary pipes from the retorts to the outlet-pipe of Gasholder, according to plans and specifications to be seen at the works.

Any further information can be obtained by applying to Mr. Jonathan Wilkinson, Grimesthorpe.

Tenders to be sent in, addressed to the Secretary, on or before the 29th day of September.

The Directors do not bind themselves to accept the lowest or any tender.

H. SINGLETON, Secretary.

WIDNES GAS-WORKS EXTENSION.

THE Gas-Works Committee of the Widnes Local Board are prepared to receive TENDERS for the excavation, brickwork, &c., necessary in the construction of a GASHOLDER-TANK, 106 ft. 6 in. in diameter, and 26 ft. deep.

The Drawings and Specification may be seen daily, "Saturdays excepted," between the hours of Ten and Five, on application to the Engineer at the Gas-Works, of whom duplicate bills of quantities may be had on payment of one guinea.

Tenders to be addressed to the Chairman of the Gas-Works Committee, endorsed "Tender for Gasholder-Tank," and delivered at the Gas-Works, Widnes, not later than the 2nd of October next.

The Board do not bind themselves to accept the lowest or any tender.

T. A. DREW, Engineer and Manager.

Gas-Works, Widnes, Sept., 1874.

TO MANUFACTURERS OF DYEING AGENTS, CREOSOTE, HEAVY OILS, NAPHTHA, DISINFECTING POWDER, COMPOUNDS OF AMMONIA, ARTIFICIAL MANURES, &c.

THE Corporation of Nottingham are desirous to receive TENDERS for the purchase of the TAR and AMMONIACAL LIQUOR to be manufactured at their stations at Nottingham, Radford, and Basford, in the next ensuing period of Five or Seven years, at the option of the Contractor, commencing on the 2nd day of November next.

The whole of the works of the Corporation are alongside public railways, and have branches into them, and the principal station (in the town of Nottingham) is located on the margin of the Nottingham Canal, which communicates with the general system of canals, and also with the navigable river Trent.

The annual quantity of Tar will probably amount to 650,000 gallons or upwards, and the annual quantity of Ammoniacal Liquor will probably amount to 1,500,000 gallons or upwards.

Intending Contractors will be supplied with forms of tender on application to Mr. J. Wilson, at the Gas Office, Nottingham, and the tenders must be delivered on or before Wednesday, the 7th day of October next.

SAM. GEO. JOHNSON, Town-Clerk.

Gas Department, Offices, George Street, Nottingham, Sept. 16, 1874.

SWANSEA, GLAMORGANSHIRE.

IMPORTANT SALE OF SWANSEA GAS SHARES, Under the powers of the Swansea Gas Act, 1861.

JOHN MACK LEEDER begs respectfully to announce that he has been favoured with instructions to SELL by public AUCTION, at the Mackworth Arms Hotel, Swansea, on Friday, Oct. 9, 1874 (subject to conditions of sale to be then produced, and in such lots as shall be determined on), 400 NEW SHARES, of £25 each, in the Swansea Gaslight Company.

These shares are issued under the authority contained in the 23rd section of the Swansea Gas Act, 1861, and are offered for sale by public auction in pursuance of the 24th section of that Act, and of a resolution passed at the general meeting of the Proprietors, held at Swansea, on the 17th of April, 1874.

The shares will be offered in such lots as to meet the convenience of all classes of investors, whose particular attention is respectfully directed by the Auctioneer to this safe and increasingly profitable property.

Sale to commence at half-past One for Two o'clock in the afternoon precisely.

Printed particulars may be obtained on application to CHARLES NORTON, Esq., Solicitor, Swansea; of the Secretary and Manager of the Company; or at the Auctioneer's Offices, Oxford Chambers, SWANSEA.

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To assist Secretaries in preparing Balance-Sheets, according to the "Gas-Works Clauses Act, 1871;" or may be consulted with respect to Accounts generally.

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MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

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MANUFACTURE AND DISTRIBUTION OF GAS. These sheets are the same as were laid before the Dublin Meeting of the British Association of Gas Managers; but in the REPRINT, NOTES have been added for the guidance of those using them. Copies of the two sheets may now be had, price 5s.

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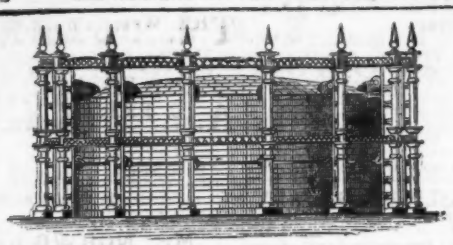

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Lists on application.

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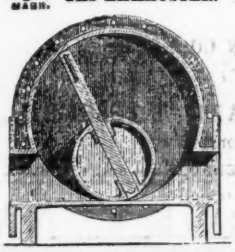

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ARE NOW MANUFACTURED BY
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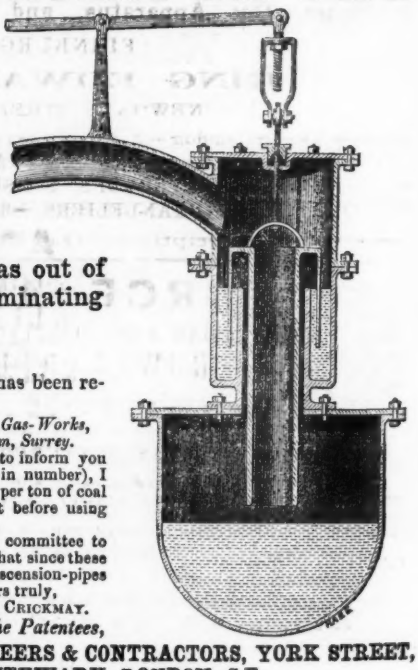

The advantages are—
1st, There is no pressure on the Retorts.
2nd, No deposit of Carbon.
3rd, No scurfing required.
4th, Never a choked Ascension Pipe.
5th, Saves Fuel and Wear and Tear.
6th, Gets 10 per cent. more Gas out of the Coal, and a higher Illuminating Power.
7th, Is never out of order.

The following (among other letters) has been received:—

Engineer's Office, Metropolitan District Asylum Gas-Works, Caterham, Surrey.
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Dear Sirs,—In reply to your inquiries, I beg to inform you that since I have used your Patented Dips (ten in number), I find my make has increased over 1000 cubic feet per ton of coal carbonized, my usual make being 9070 cubic feet before using your Dips, and 10,150 cubic feet since using them.
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Jan. 15, 1874. WM. CRICKMAY.

For terms of use and cost, apply only to the Patentees,
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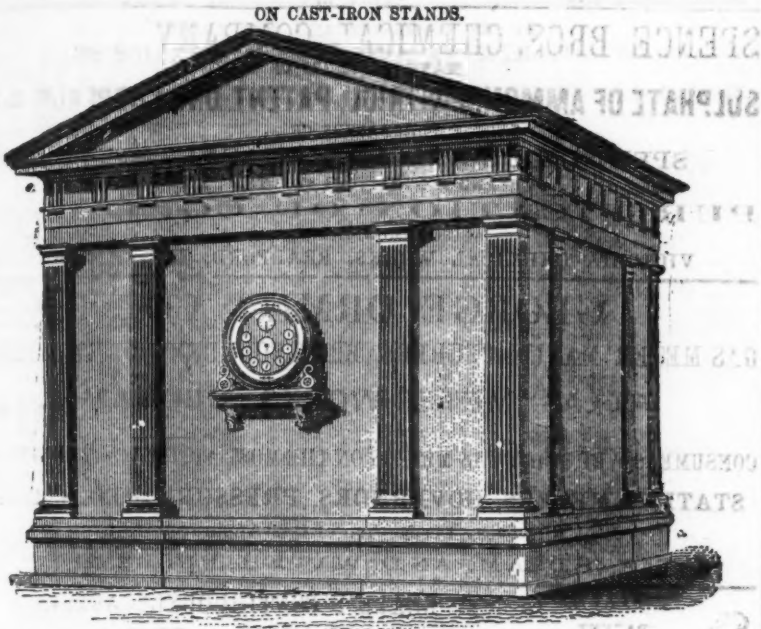

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STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

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BREEZE AND TAR FUEL MACHINE.

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N.B.—The second edition of this Work, *now ready*, contains Illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

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Yields 10,880 cubic feet of 16·1-candle gas, and fully 13 cwts. of first-class coke per ton.

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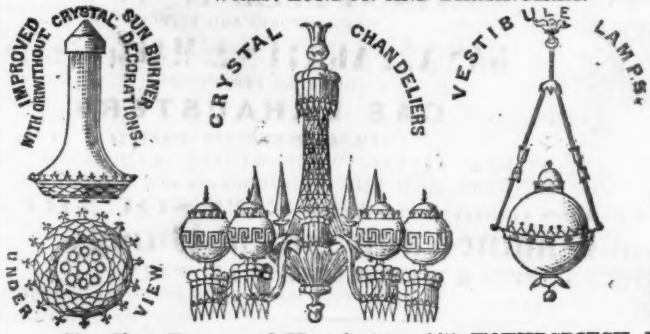

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Of every description.

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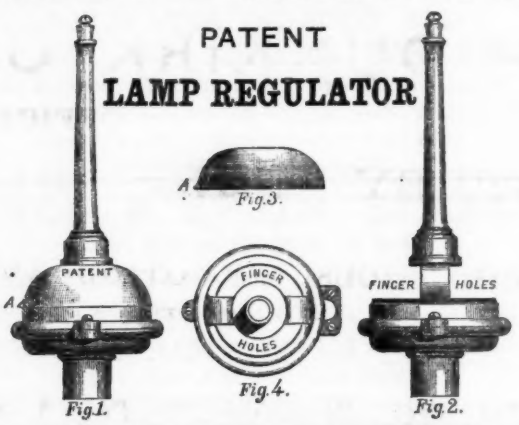

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PATENTEES OF
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Attention is respectfully requested to the following extract from a lecture "On the Economical Combustion of Coal Gas," delivered to the Philosophical Society of Glasgow, by Dr. W. Wallace, F.R.S.E., F.C.S., Gas Examiner for the city of Glasgow, on the 4th of March last:—

"A few years ago, a simple form of Gas Regulator for Street Lamps was introduced, I do not know by whom, and various forms of it, and improvements on it, have been made by many practical gas engineers. Of all the modifications of the instrument, the best in my opinion is that of Mr. D. Bruce Peebles, of Edinburgh; in fact, his Lamp Regulators are so superior that they are likely to supplant all others. Already about 9000 of these have been applied to the street-lamps in Glasgow, and I understand it is the intention of the authorities to introduce them all over the town. The saving thereby effected I calculate to be about £6000 per annum, without any diminution of light. One of the great advantages of Mr. Peebles's apparatus over all others is that it can be regulated while the gas is burning."

Since the above date, another 1000 have been supplied to Glasgow, and they are being largely adopted at home and abroad.

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This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 33-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

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MUIRKIRK, No. 1, CANNEL

Yields 11,600 cubic feet of 34·3-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash.

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Yields 10,700 cubic feet of 32·77-candle gas per ton, and 9½ cwts. of coke, containing 11 per cent. of ash.

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STRONGLY RECOMMEND A TRIAL OF THEIR

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—

(COPY.)

	Cubic Feet of Gas per Ton of Coal.	Illuminating Power in Candles.	Coke per Ton of Coal used.	Ash in Coke, per Cent.	Sulphur in Coal, per Cent.
Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.

Horseferry Road, Westminster, March, 1870. (Signed) F. J. EVANS.

These Nuts are extensively used by various Gas Companies throughout the Kingdom, who bear strong testimony to their value.

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IMPROVED DRY GAS-METERS, in Cast-Iron or Tin-Plate Cases;

STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges, Governors, Test Holders, &c., &c.

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SMALL GAS COOKING STOVE, No. 133, 12 in. wide. £1 15s.

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SMART'S BUILDINGS, HIGH HOLBORN,

AND

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GAS STOVE MANUFACTURERS.

COPY TESTIMONIAL.

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Northampton, May 14, 1874.

Messrs. Billing and Co.,

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I remain, yours obediently,
JOHN EUNSON, Jun., Manager.

90, Hatton Garden, London.

London: Printed by WILLIAM BOVONTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, September 22, 1874.